US011706388B2

(12) **United States Patent**
Gilley et al.

(10) **Patent No.: US 11,706,388 B2**
(45) **Date of Patent: *Jul. 18, 2023**

(54) **SYSTEM AND METHOD FOR MOVIE SEGMENT BOOKMARKING AND SHARING**

(71) Applicant: **Open Text SA ULC**, Halifax (CA)

(72) Inventors: **Thomas S. Gilley**, New York, NY (US); **Eric Hoffert**, South Orange, NJ (US); **Brenda Pomerance**, New York, NY (US); **Razvan Pop**, Satu Mare (RO)

(73) Assignee: **Open Text SA ULC**, Halifax (CA)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **17/836,860**

(22) Filed: **Jun. 9, 2022**

(65) **Prior Publication Data**

US 2022/0303504 A1 Sep. 22, 2022

Related U.S. Application Data

(63) Continuation of application No. 17/209,101, filed on Mar. 22, 2021, now Pat. No. 11,381,779, which is a (Continued)

(51) **Int. Cl.**
G06F 3/048 (2013.01)
H04N 7/173 (2011.01)
(Continued)

(52) **U.S. Cl.**
CPC ***H04N 7/173*** (2013.01); ***G06F 16/78*** (2019.01); ***G06F 16/7844*** (2019.01);
(Continued)

(58) **Field of Classification Search**
CPC H04N 7/173; H04N 21/2547; H04N 21/25866; H04N 21/262; H04N 21/2743;
(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,973,130 B1 12/2005 Wee et al.
8,949,899 B2 2/2015 Errico et al.
(Continued)

OTHER PUBLICATIONS

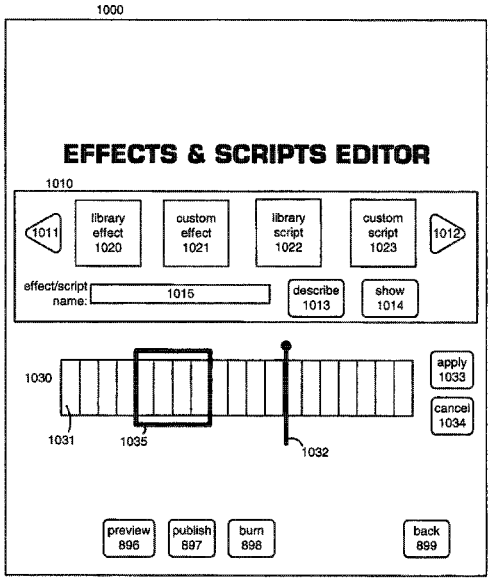
Office Action issued for U.S. Appl. No. 17/021,479 dated Jul. 22, 2022, 17 pages.
(Continued)

Primary Examiner — William C Trapanese
(74) *Attorney, Agent, or Firm* — Sprinkle IP Law Group

(57) **ABSTRACT**

Several ways are provided for a viewer of a movie to create a deep tag, that is, a bookmark for a segment of the movie. The deep tag can be associated with descriptive text and sent to an address provided by the viewer, either an e-mail address or an instant messaging address. Additionally, before the deep tag is created, it can be checked whether the content owner of the movie is known. If known, the content owner's rules, if any, regarding deep tagging are followed. If unknown, a set of registered content owners can be alerted of the presence of new content. When ownership of the new content is established, the already-created deep tags can be updated in accordance with the content owner's rules, if any, regarding deep tagging.

20 Claims, 36 Drawing Sheets



Related U.S. Application Data

continuation of application No. 16/744,840, filed on Jan. 16, 2020, now Pat. No. 10,958,876, which is a continuation of application No. 15/365,308, filed on Nov. 30, 2016, now Pat. No. 10,594,981, which is a continuation of application No. 11/713,115, filed on Feb. 27, 2007, now Pat. No. 9,648,281, which is a continuation-in-part of application No. 11/592,901, filed on Nov. 3, 2006, now Pat. No. 8,145,528, which is a continuation-in-part of application No. 11/439,593, filed on May 23, 2006, now Pat. No. 7,877,689, and a continuation-in-part of application No. 11/439,594, filed on May 23, 2006, now Pat. No. 8,724,969, and a continuation-in-part of application No. 11/439,600, filed on May 23, 2006, now Pat. No. 8,755,673.

(60) Provisional application No. 60/683,662, filed on May 23, 2005.

(51) **Int. Cl.**

G06F 16/78	(2019.01)
G06F 16/783	(2019.01)
H04N 21/2547	(2011.01)
H04N 21/258	(2011.01)
H04N 21/262	(2011.01)
H04N 21/2743	(2011.01)
H04N 21/4786	(2011.01)
H04N 21/4788	(2011.01)
H04N 21/81	(2011.01)
H04N 21/8355	(2011.01)
H04N 21/845	(2011.01)
G11B 27/034	(2006.01)

(52) **U.S. Cl.**

CPC ***G11B 27/034*** (2013.01); ***H04N 21/2547*** (2013.01); ***H04N 21/25866*** (2013.01); ***H04N 21/262*** (2013.01); ***H04N 21/2743*** (2013.01); ***H04N 21/4786*** (2013.01); ***H04N 21/4788*** (2013.01); ***H04N 21/812*** (2013.01); ***H04N 21/8355*** (2013.01); ***H04N 21/8455*** (2013.01); *G11B 2220/2562* (2013.01)

(58) **Field of Classification Search**

CPC H04N 21/4786; H04N 21/4788; H04N 21/812; H04N 21/8355; H04N 21/8455; G06F 16/7844; G06F 16/78; G11B 27/034; G11B 2220/2562

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

11,589,087	B2	2/2023	Gilley et al.	
11,626,141	B2	4/2023	Gilley et al.	
2001/0023436	A1	9/2001	Srinivasan et al.	
2003/0191816	A1	10/2003	Landress et al.	
2006/0267995	A1*	11/2006	Radloff	H04N 21/47217 345/530

OTHER PUBLICATIONS

Office Action issued for U.S. Appl. No. 17/093,727 dated Sep. 1, 2022, 20 pages.

Office Action issued for U.S. Appl. No. 17/196,087 dated Aug. 12, 2022, 37 pages.

Office Action issued for U.S. Appl. No. 17/502,395 dated Sep. 14, 2022, 8 pages.

Office Action issued for U.S. Appl. No. 17/010,731 dated Oct. 27, 2022, 20 pages.

Notice of Allowance issued for U.S. Appl. No. 17/021,479 dated Nov. 17, 2022, 10 pages.

Office Action issued for U.S. Appl. No. 17/093,727 dated Dec. 23, 2022, 19 pages.

Notice of Allowance issued for U.S. Appl. No. 17/502,395 dated Dec. 15, 2022, 7 pages.

Final Office Action issued for U.S. Appl. No. 17/196,087 dated Jan. 10, 2023, 40 pages.

Final Office Action issued for U.S. Appl. No. 17/093,727, dated Mar. 31, 2023, 22 pages.

* cited by examiner

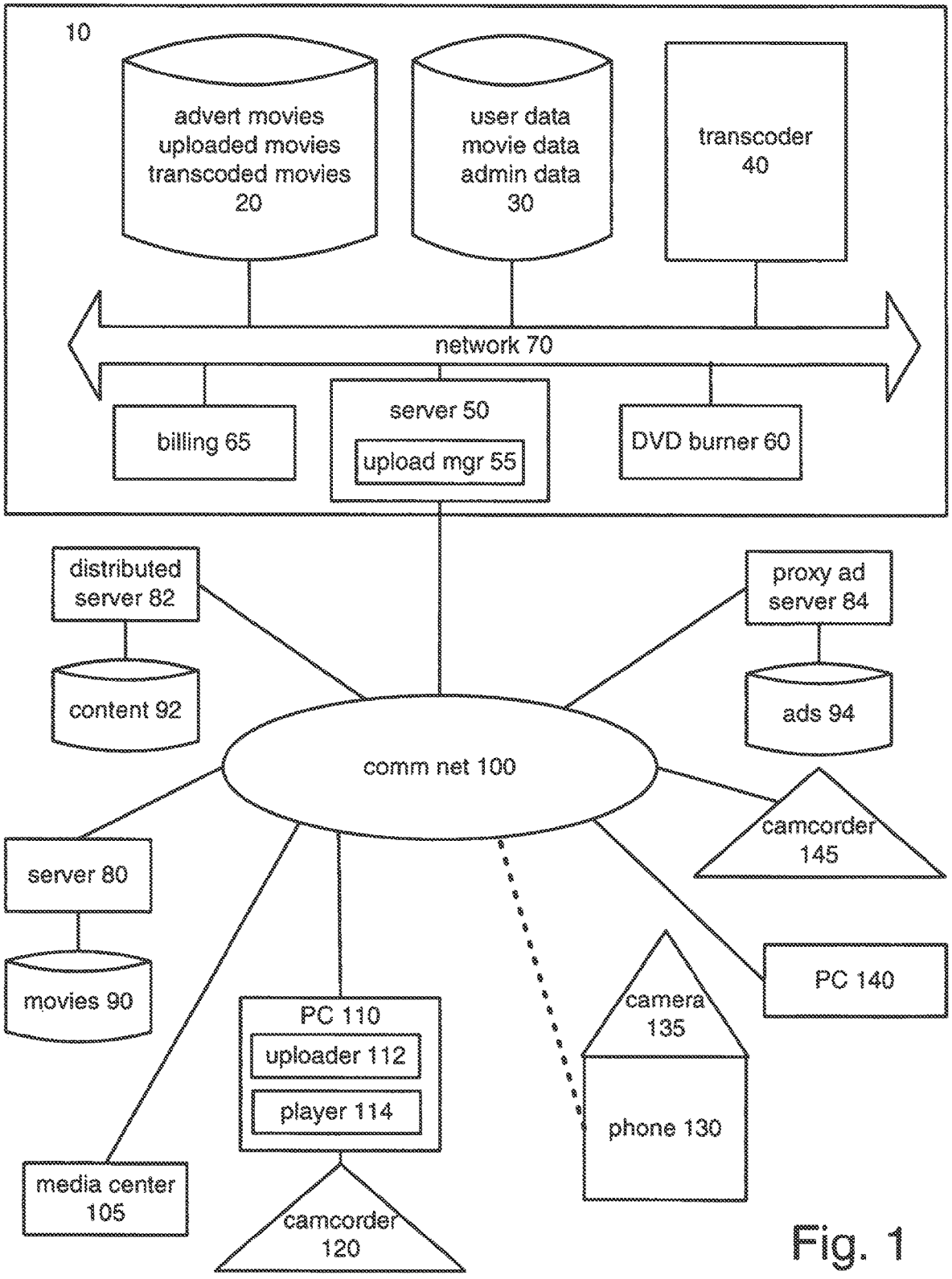

10
advert movies
uploaded movies
transcoded movies
20
user data
movie data
admin data
30
transcoder
40
network 70
billing 65
server 50
upload mgr 55
DVD burner 60
distributed
server 82
content 92
proxy ad
server 84
ads 94
comm net 100
camcorder
145
server 80
movies 90
PC 140
camera
135
PC 110
uploader 112
player 114
phone 130
media center
105
camcorder
120

Fig. 1

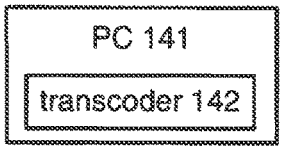


Fig. 2A

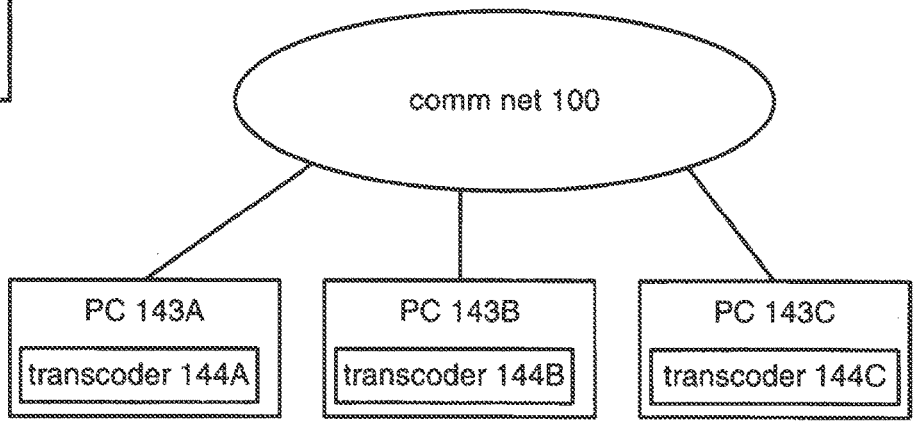


Fig. 2B

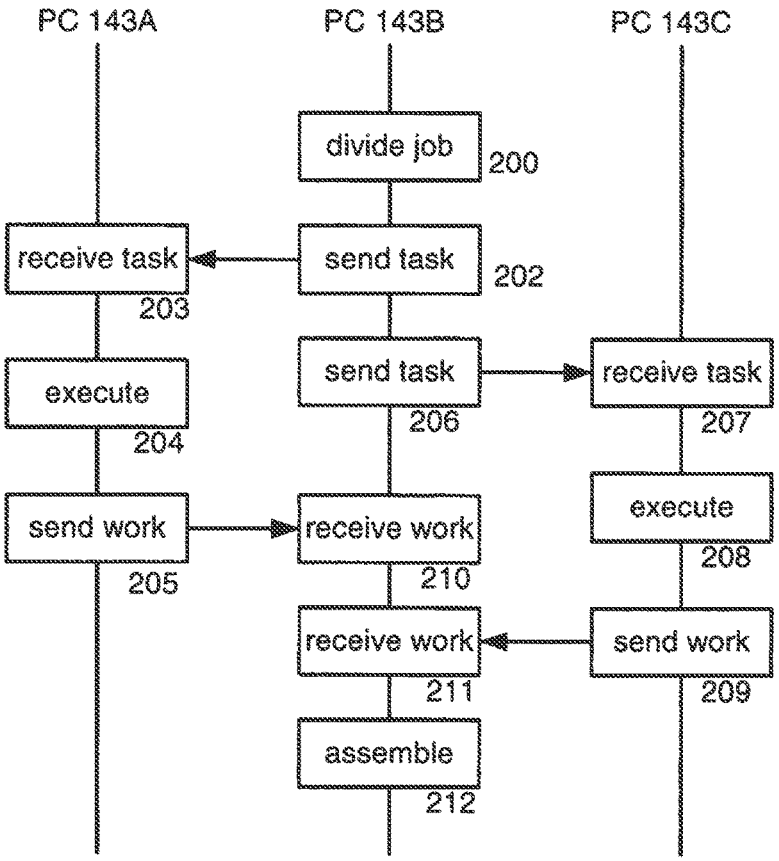


Fig. 3

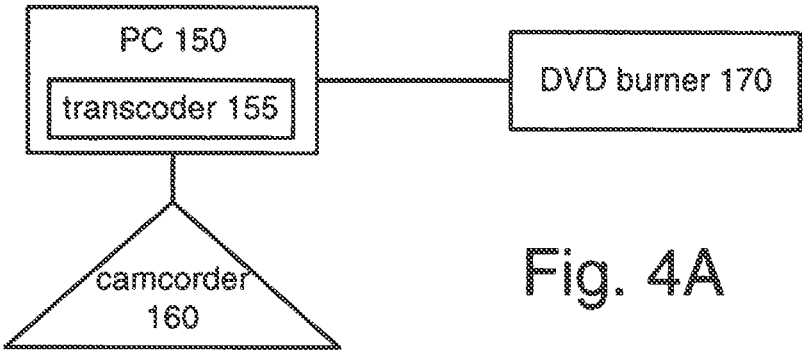


Fig. 4A

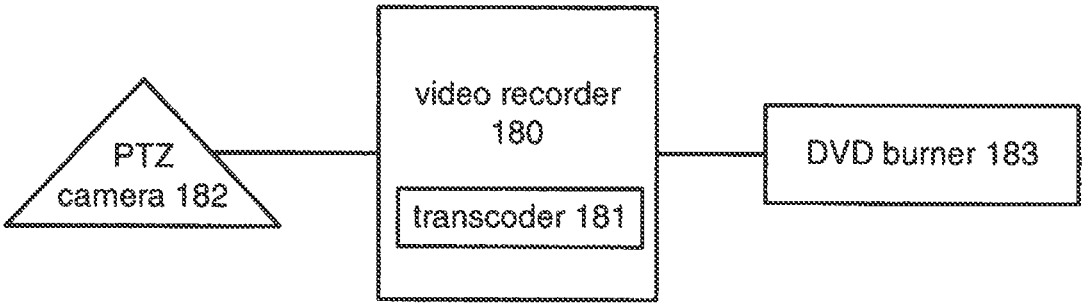


Fig. 4B

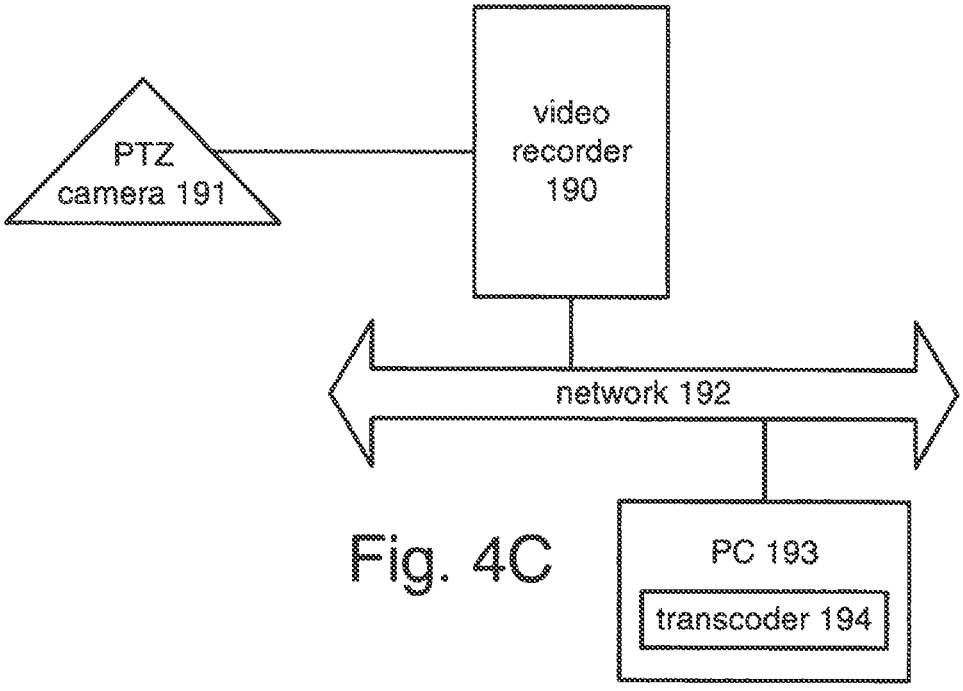


Fig. 4C

Fig. 5A
(Prior Art)

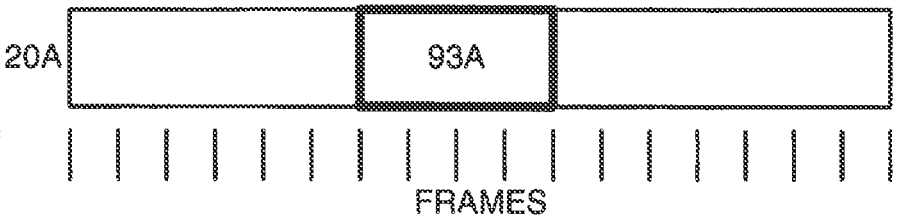


Fig. 5B
(Prior Art)

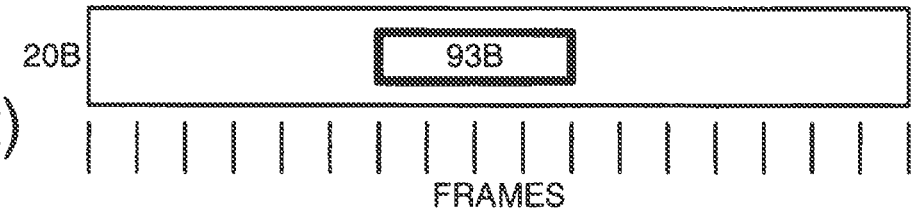


Fig. 5C
(Prior Art)

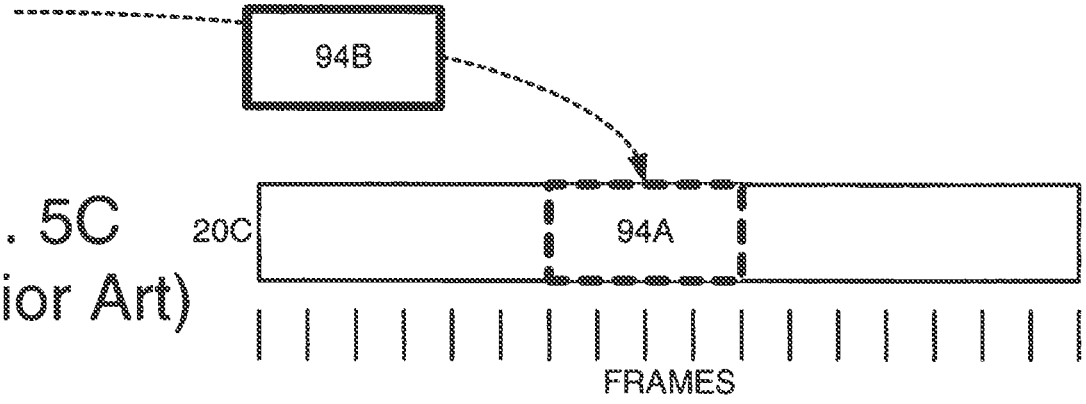
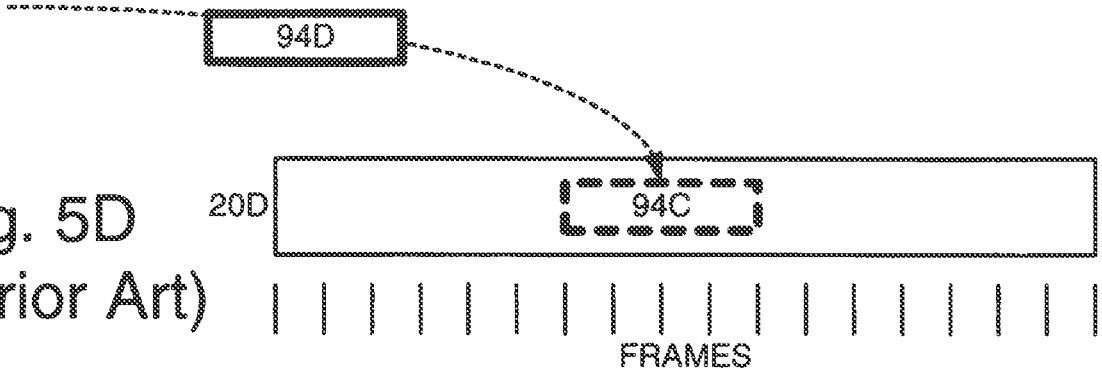


Fig. 5D
(Prior Art)



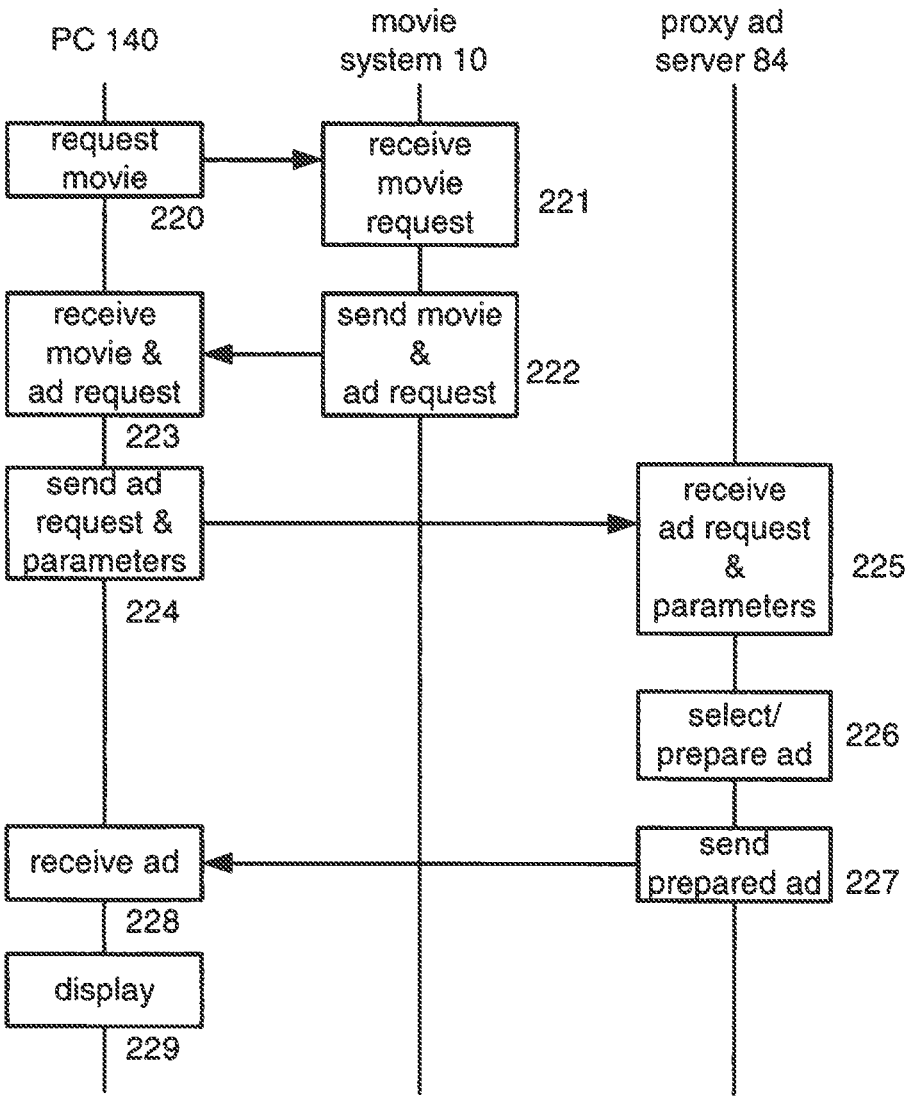


Fig. 6 (Prior Art)

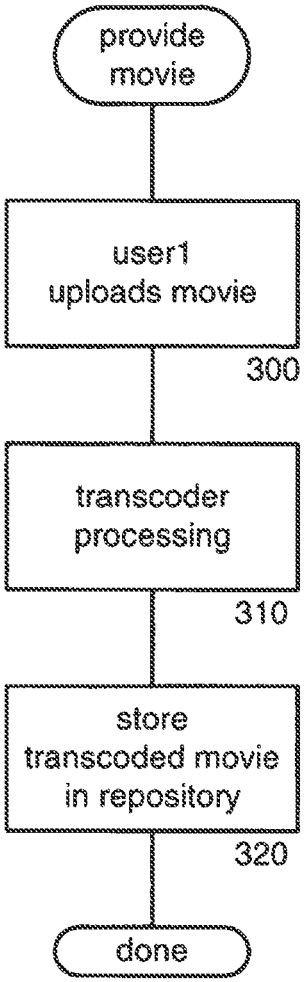

provide movie
user1 uploads movie
300
transcoder processing
310
store transcoded movie in repository
320
done

Fig. 7

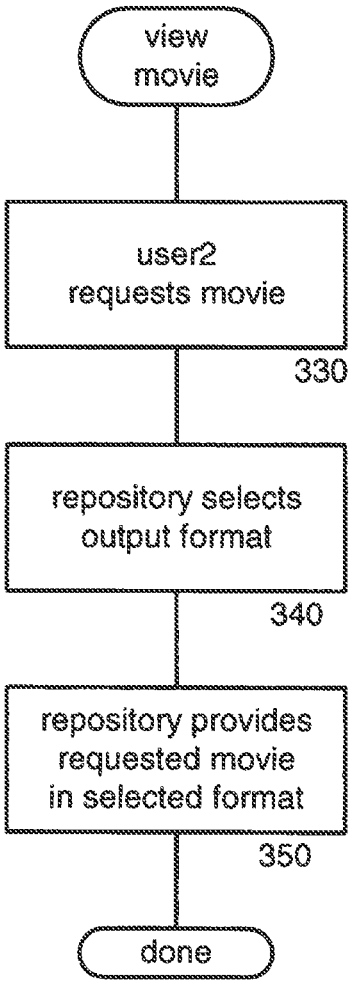

view movie
user2 requests movie
330
repository selects output format
340
repository provides requested movie in selected format
350
done

Fig. 8

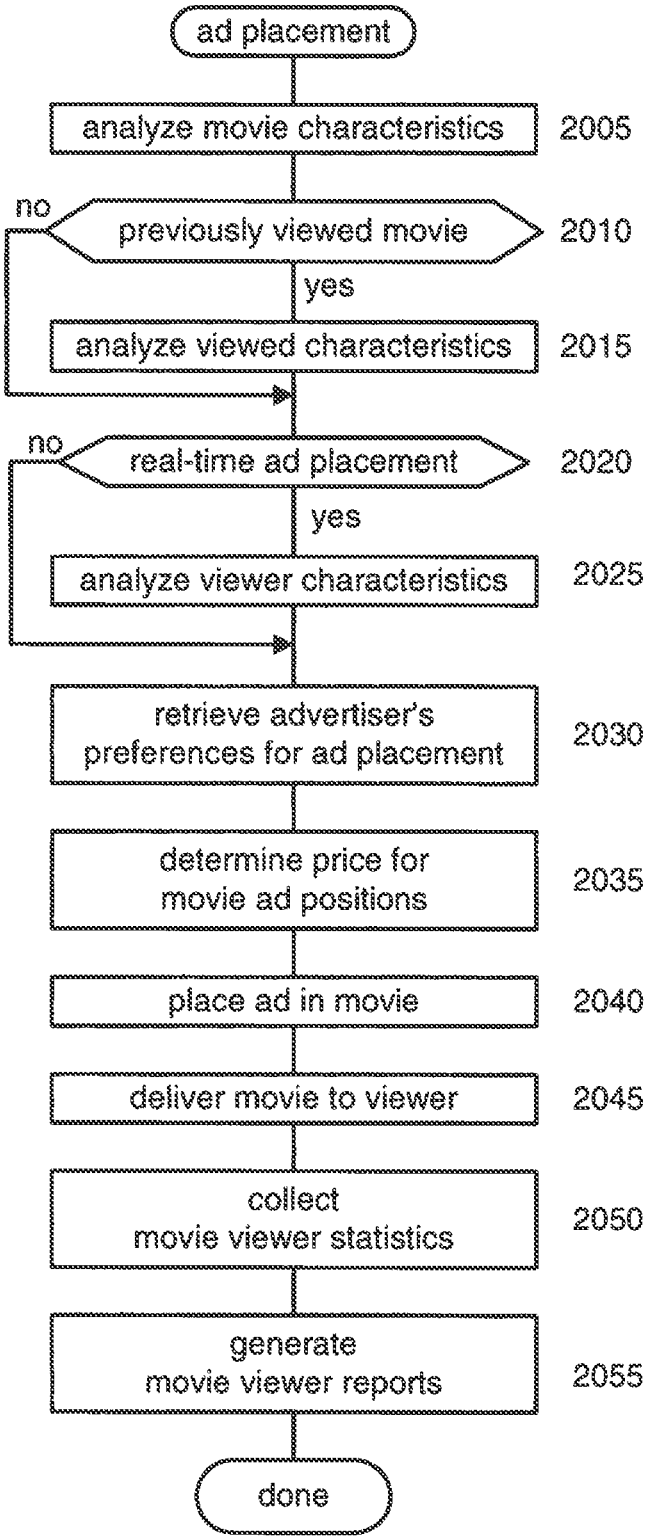

ad placement
analyze movie characteristics
2005
no
previously viewed movie
2010
yes
analyze viewed characteristics
2015
no
real-time ad placement
2020
yes
analyze viewer characteristics
2025
retrieve advertiser's preferences for ad placement
2030
determine price for movie ad positions
2035
place ad in movie
2040
deliver movie to viewer
2045
collect movie viewer statistics
2050
generate movie viewer reports
2055
done

Fig. 9

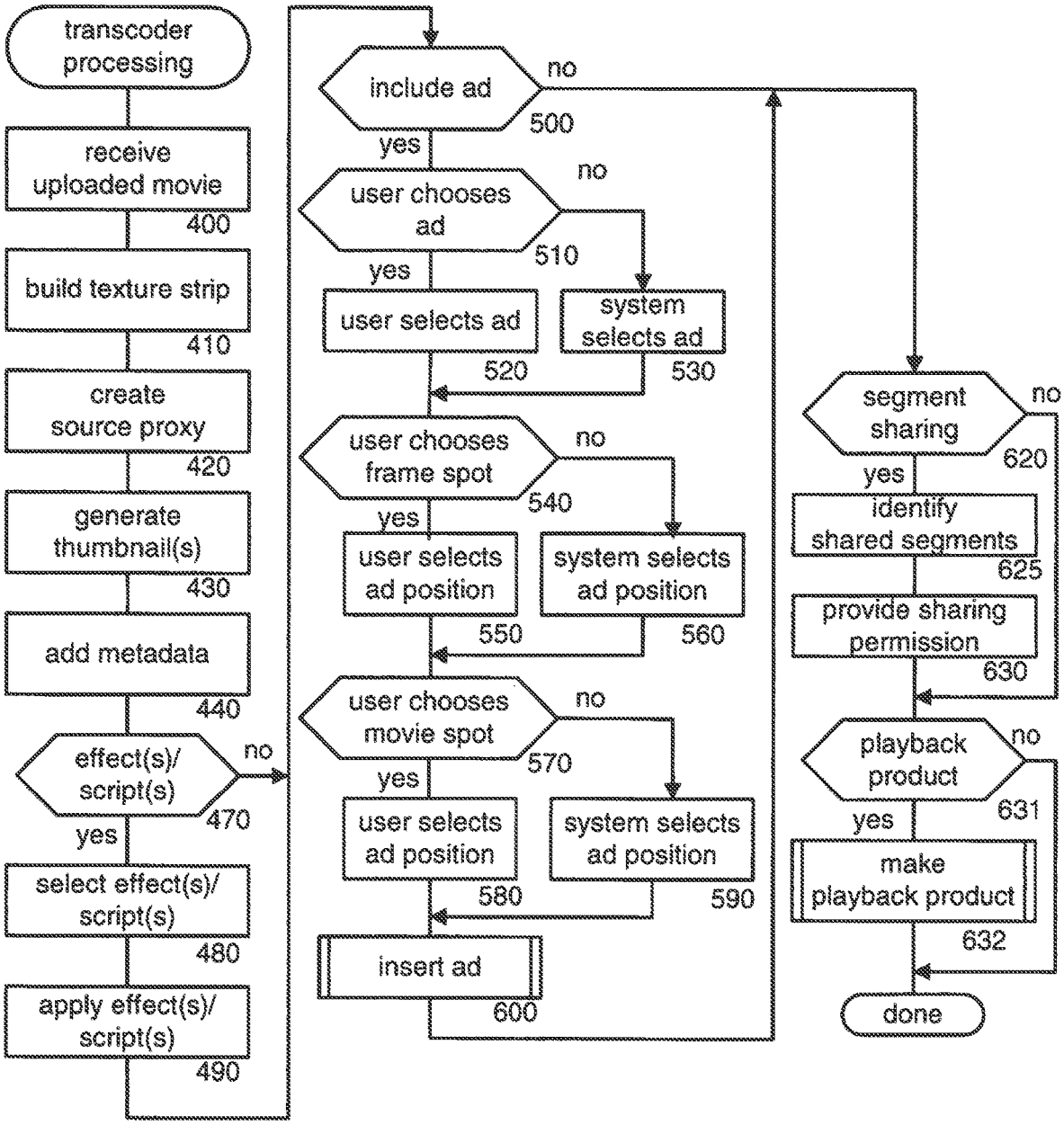

transcoder processing
receive uploaded movie
400
build texture strip
410
create source proxy
420
generate thumbnail(s)
430
add metadata
440
effect(s)/ script(s)
470
no
yes
select effect(s)/ script(s)
480
apply effect(s)/ script(s)
490
include ad
500
no
yes
user chooses ad
510
no
yes
user selects ad
520
system selects ad
530
user chooses frame spot
540
no
yes
user selects ad position
550
system selects ad position
560
user chooses movie spot
570
no
yes
user selects ad position
580
system selects ad position
590
insert ad
600
segment sharing
620
no
yes
identify shared segments
625
provide sharing permission
630
playback product
631
no
yes
make playback product
632
done

Fig. 10

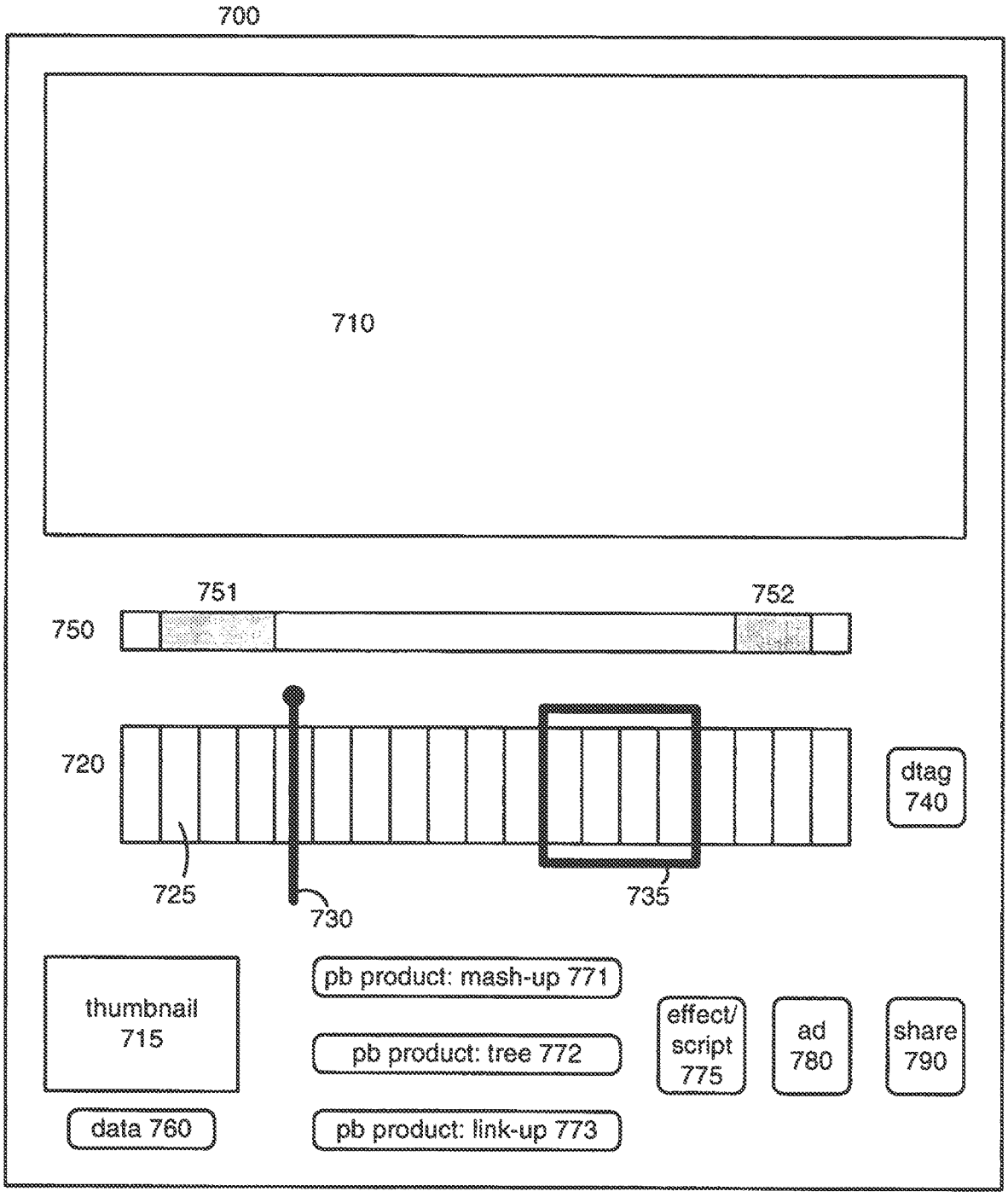

700
710
751
752
750
720
dtag
740
725
730
735
thumbnail
715
pb product: mash-up 771
pb product: tree 772
pb product: link-up 773
effect/
script
775
ad
780
share
790
data 760

Fig. 11

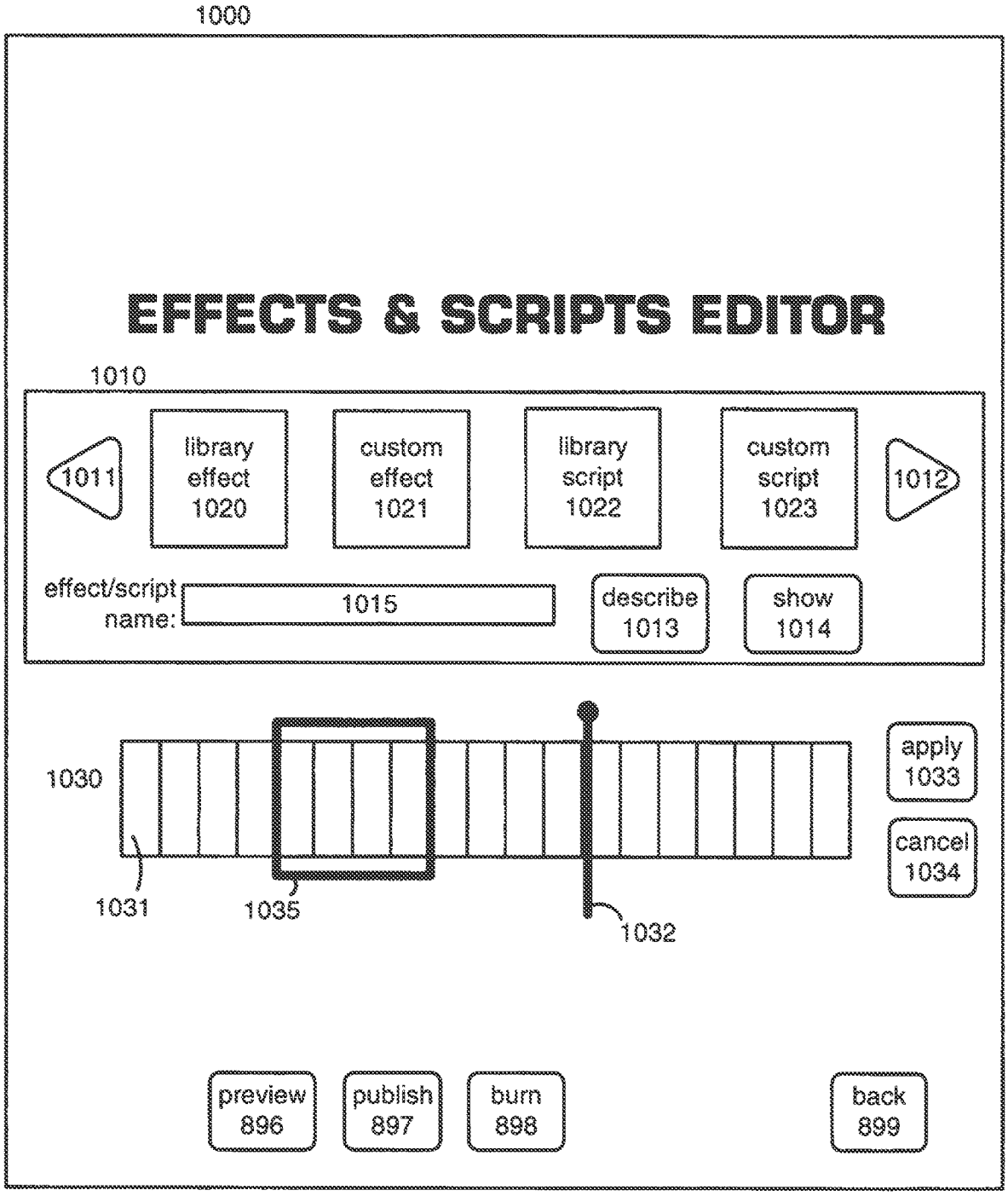

1000
EFFECTS & SCRIPTS EDITOR
1010
1011
library effect 1020
custom effect 1021
library script 1022
custom script 1023
1012
effect/script name:
1015
describe 1013
show 1014
1030
1031
1035
1032
apply 1033
cancel 1034
preview 896
publish 897
burn 898
back 899

Fig. 12

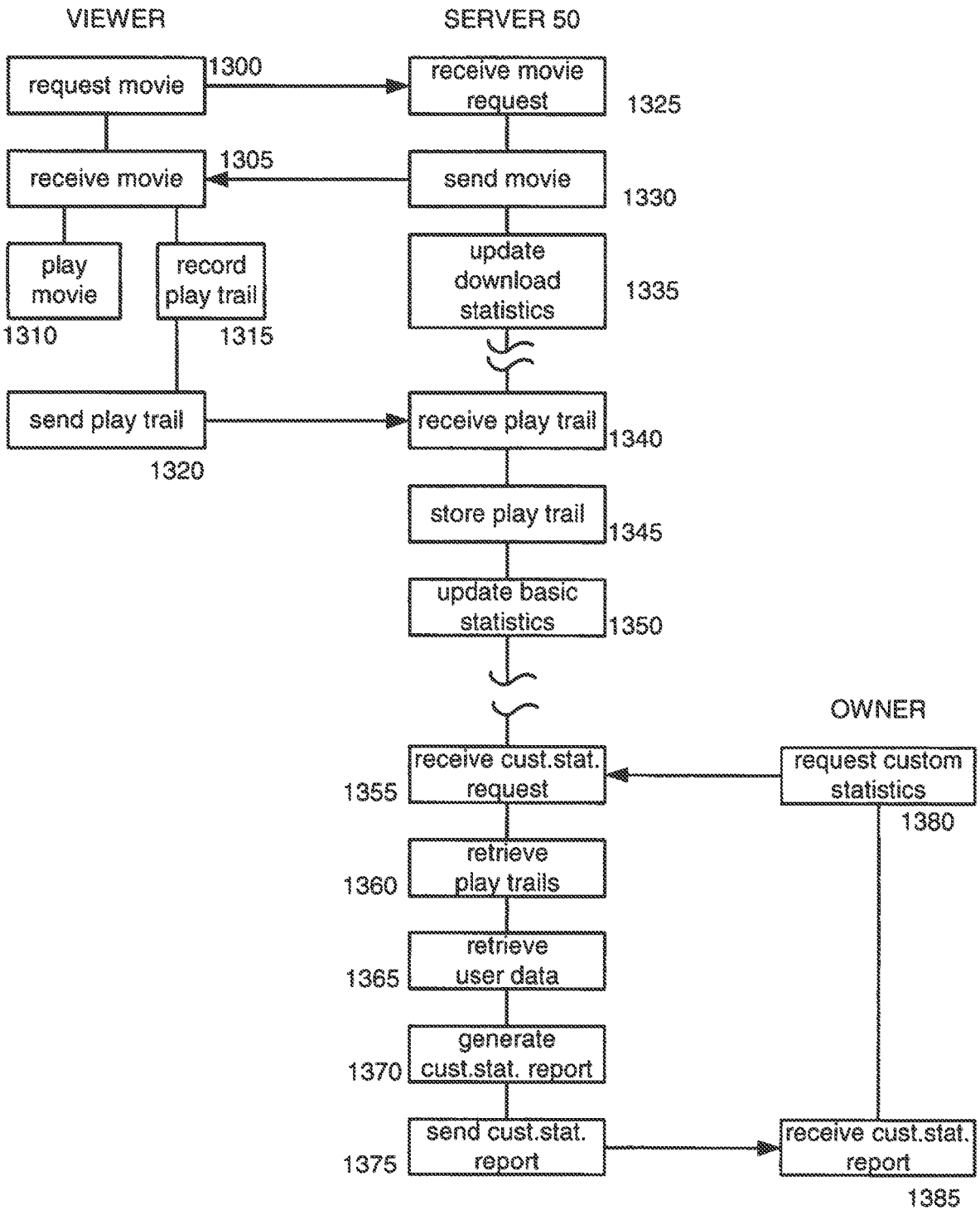

VIEWER
SERVER 50
request movie
1300
receive movie request
1325
receive movie
1305
send movie
1330
play movie
1310
record play trail
1315
update download statistics
1335
send play trail
1320
receive play trail
1340
store play trail
1345
update basic statistics
1350
OWNER
receive cust.stat. request
1355
request custom statistics
1380
retrieve play trails
1360
retrieve user data
1365
generate cust.stat. report
1370
send cust.stat. report
1375
receive cust.stat. report
1385

Fig. 13

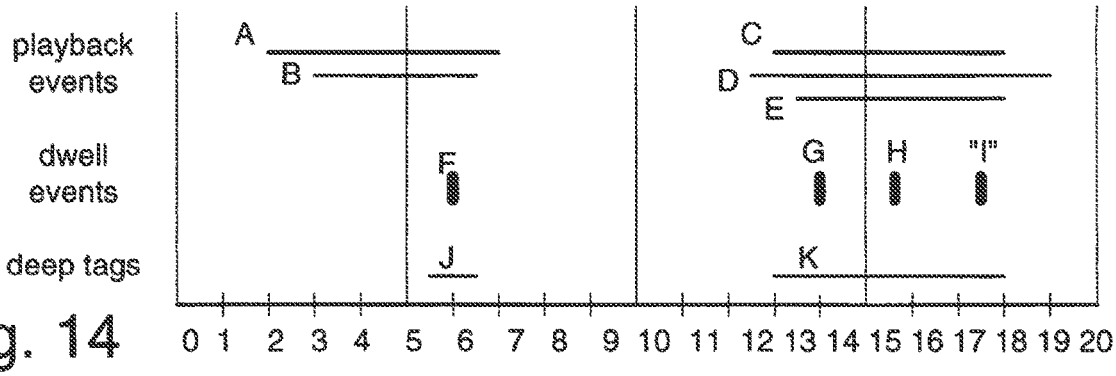

playback events
dwell events
deep tags
A
B
C
D
E
F
G
H
"I"
J
K
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Fig. 14

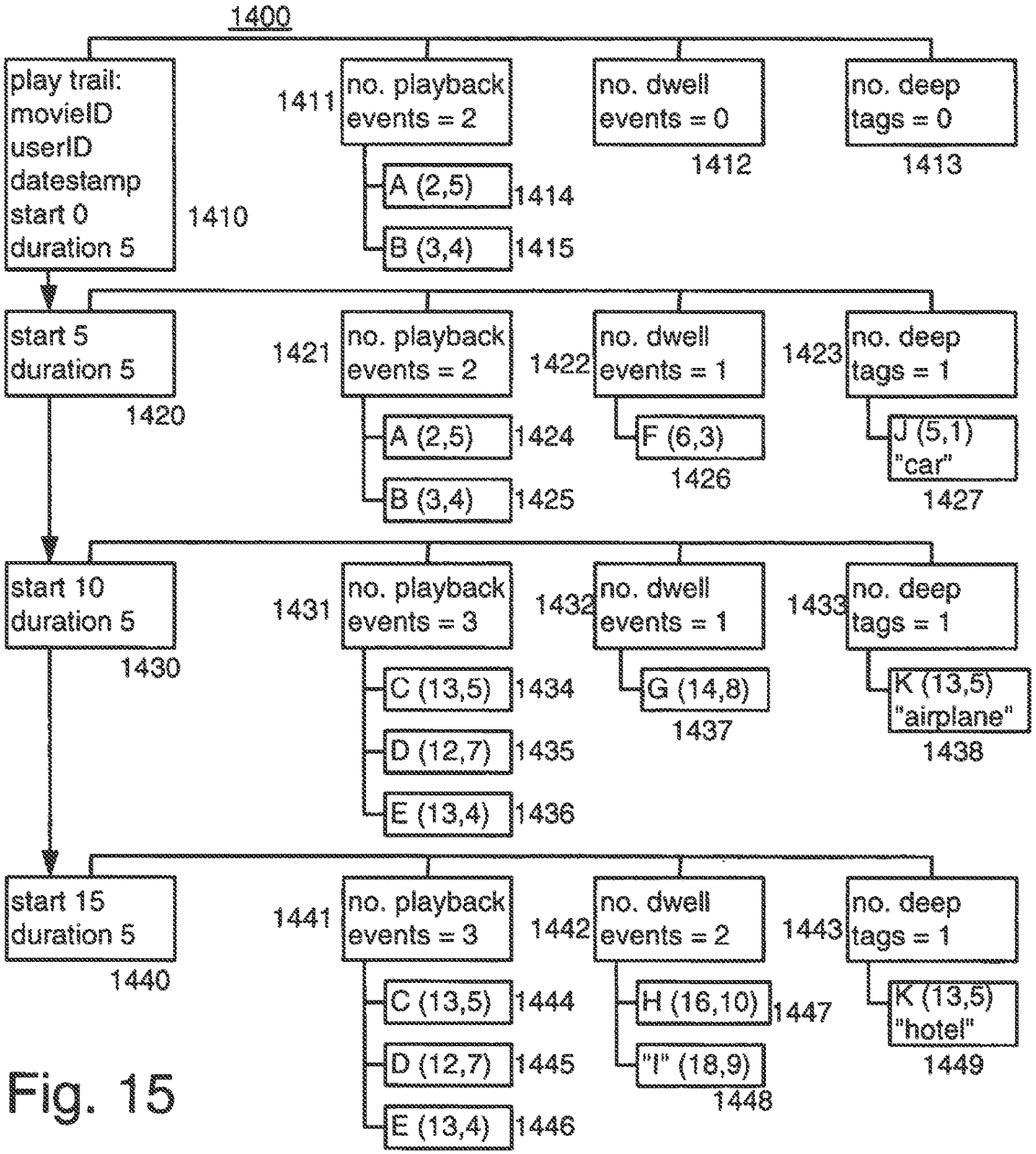

1400
play trail:
movieID
userID
datestamp
start 0
duration 5
1410
1411
no. playback events = 2
A (2,5) 1414
B (3,4) 1415
no. dwell events = 0
1412
no. deep tags = 0
1413
start 5
duration 5
1420
1421
no. playback events = 2
A (2,5) 1424
B (3,4) 1425
1422
no. dwell events = 1
F (6,3)
1426
1423
no. deep tags = 1
J (5,1) "car"
1427
start 10
duration 5
1430
1431
no. playback events = 3
C (13,5) 1434
D (12,7) 1435
E (13,4) 1436
1432
no. dwell events = 1
G (14,8)
1437
1433
no. deep tags = 1
K (13,5) "airplane"
1438
start 15
duration 5
1440
1441
no. playback events = 3
C (13,5) 1444
D (12,7) 1445
E (13,4) 1446
1442
no. dwell events = 2
H (16,10) 1447
"I" (18,9)
1448
1443
no. deep tags = 1
K (13,5) "hotel"
1449

Fig. 15

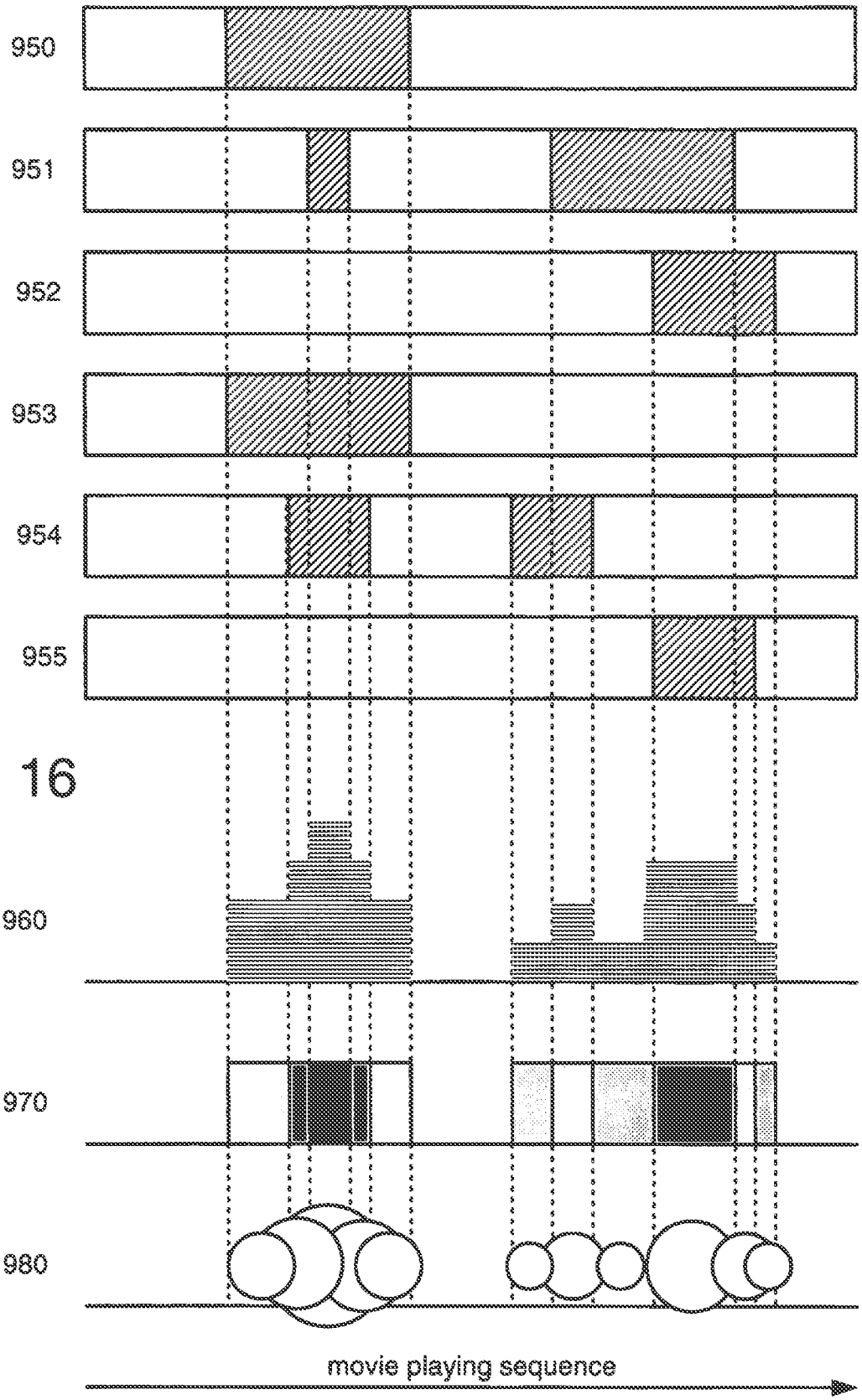


Fig. 16

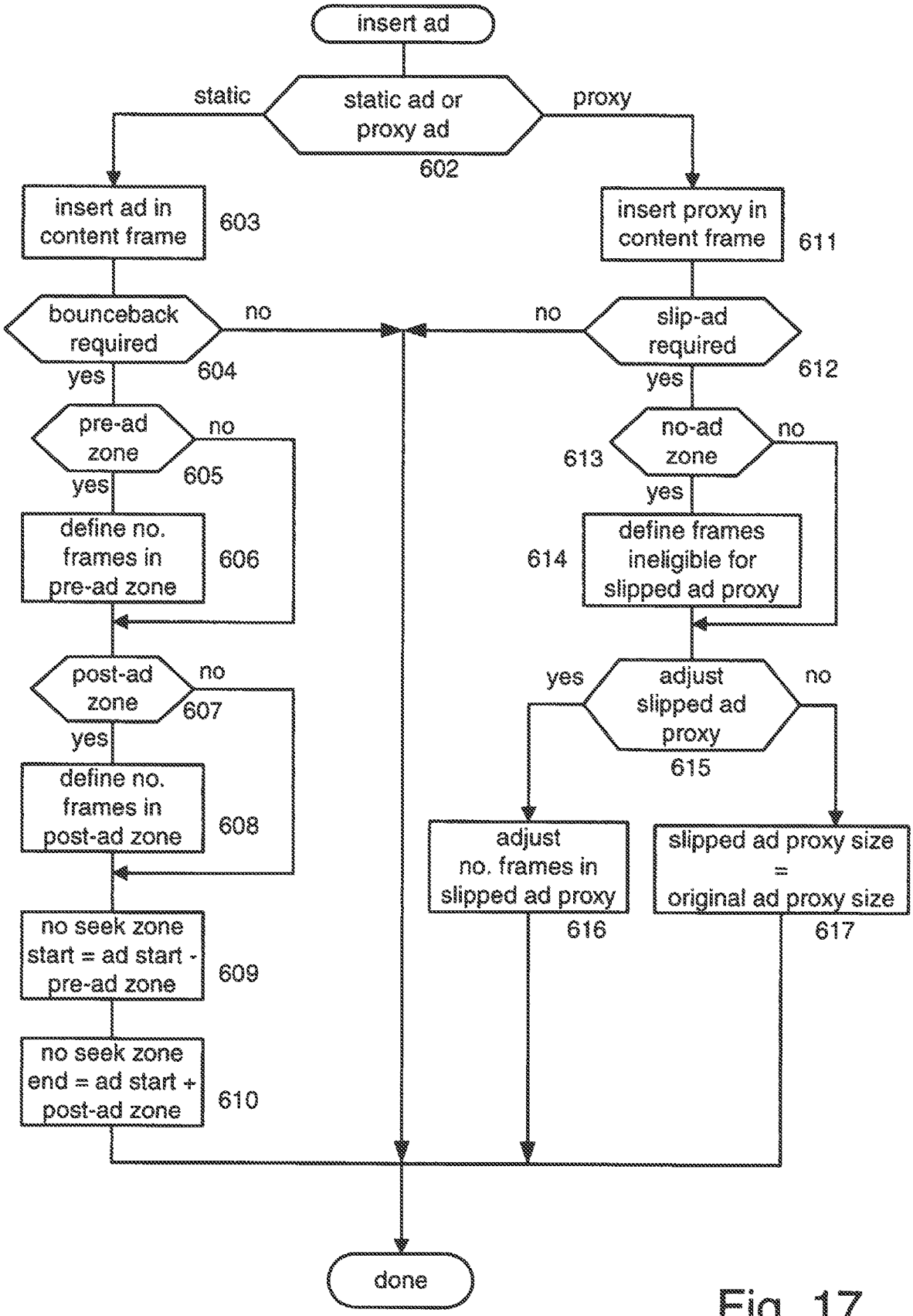

insert ad
static ad or proxy ad
602
static
proxy
insert ad in content frame
603
insert proxy in content frame
611
bounceback required
604
no
yes
slip-ad required
612
no
yes
pre-ad zone
605
no
yes
no-ad zone
613
no
yes
define no. frames in pre-ad zone
606
define frames ineligible for slipped ad proxy
614
post-ad zone
607
no
yes
adjust slipped ad proxy
615
yes
no
define no. frames in post-ad zone
608
adjust no. frames in slipped ad proxy
616
slipped ad proxy size = original ad proxy size
617
no seek zone start = ad start - pre-ad zone
609
no seek zone end = ad start + post-ad zone
610
done

Fig. 17

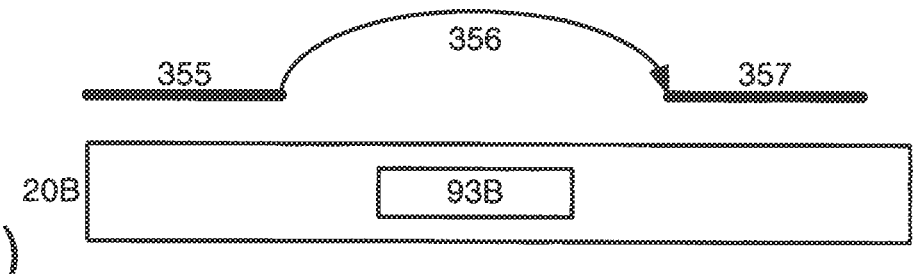


Fig. 18A
(Prior Art)

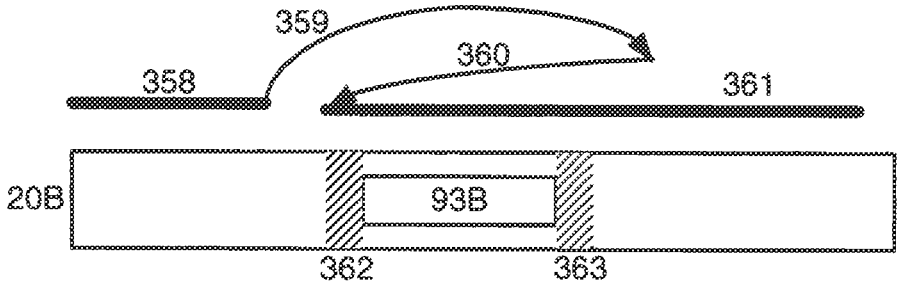


Fig. 18B

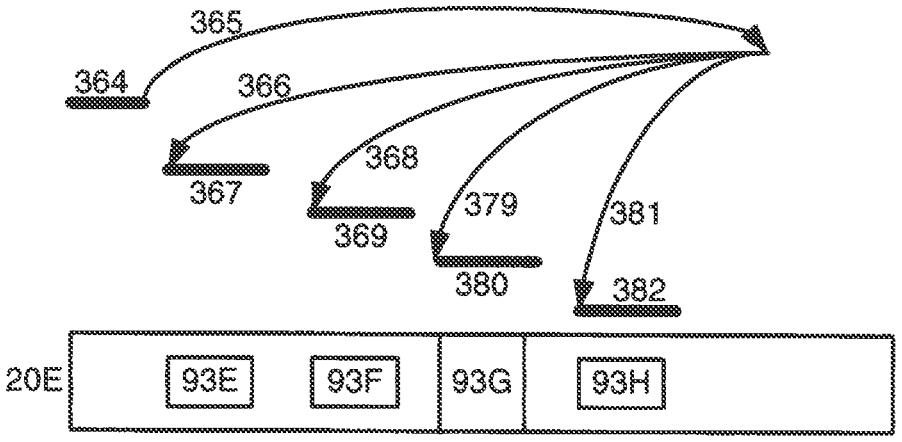


Fig. 18C

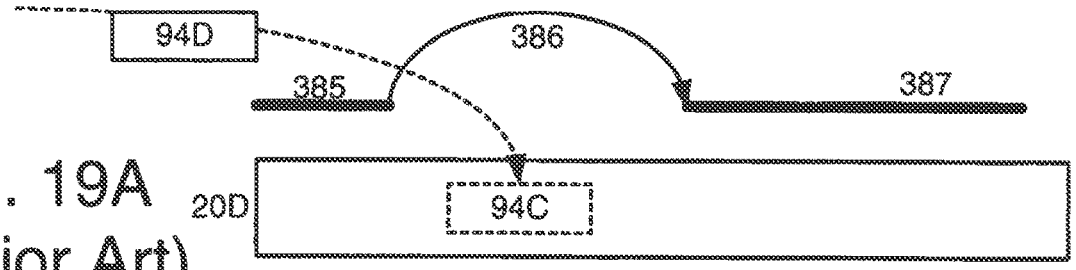


Fig. 19A
(Prior Art)

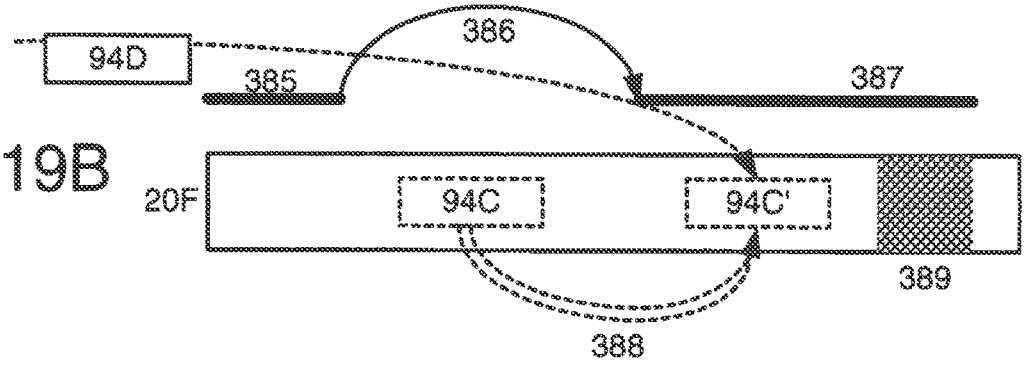


Fig. 19B

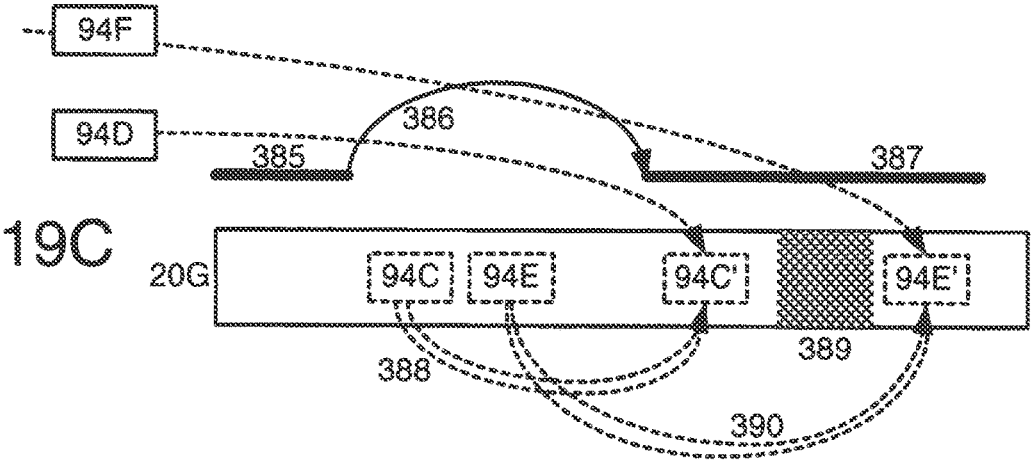


Fig. 19C

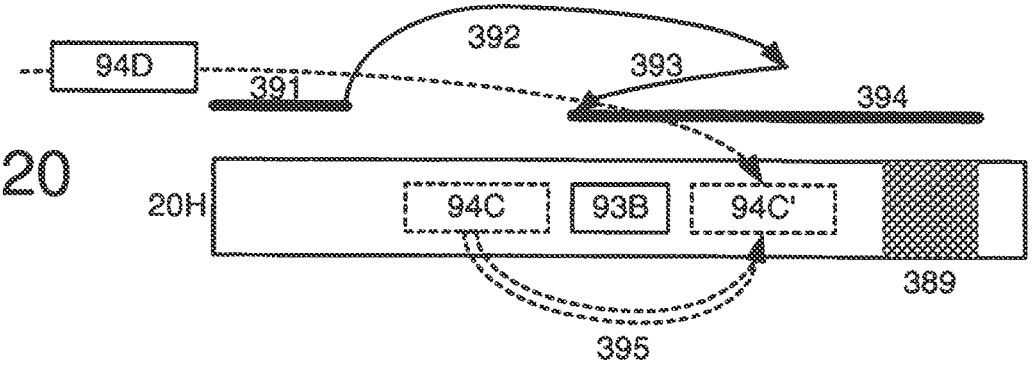


Fig. 20

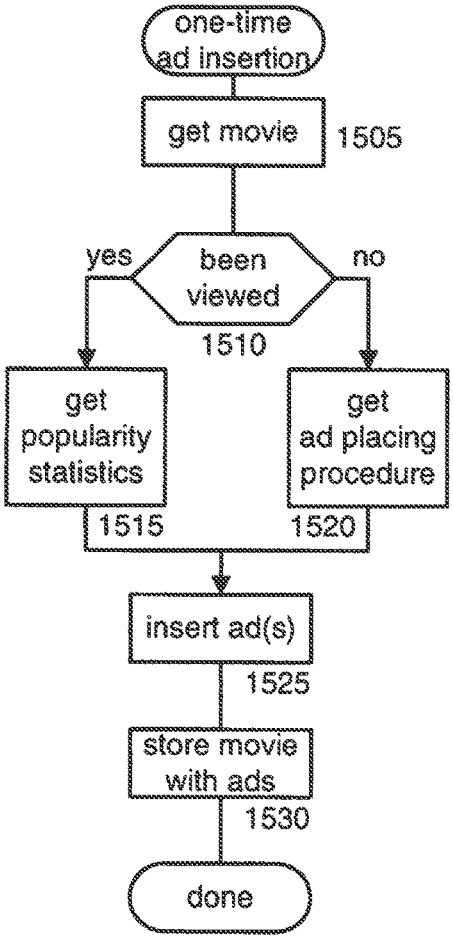


Fig. 21

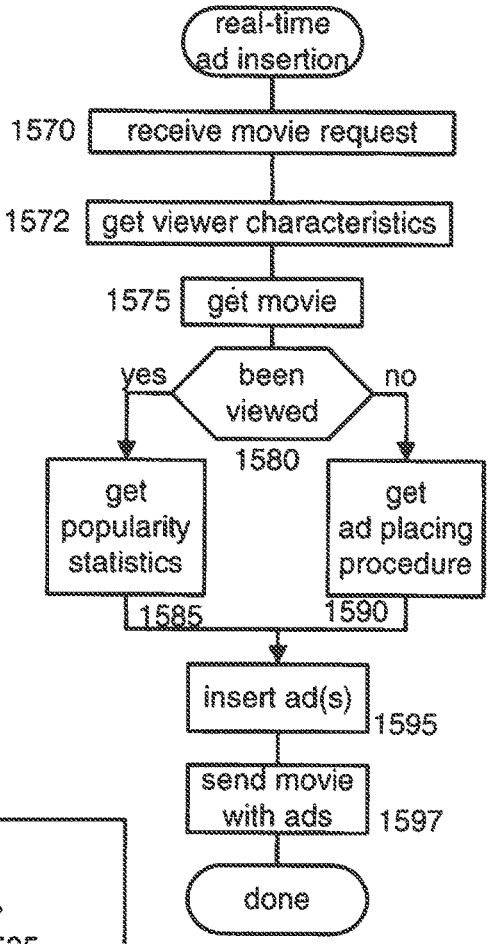


Fig. 23

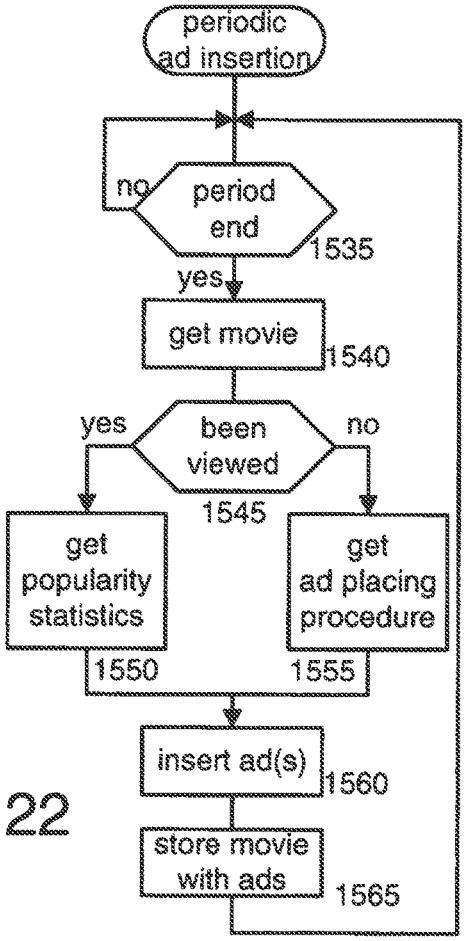


Fig. 22

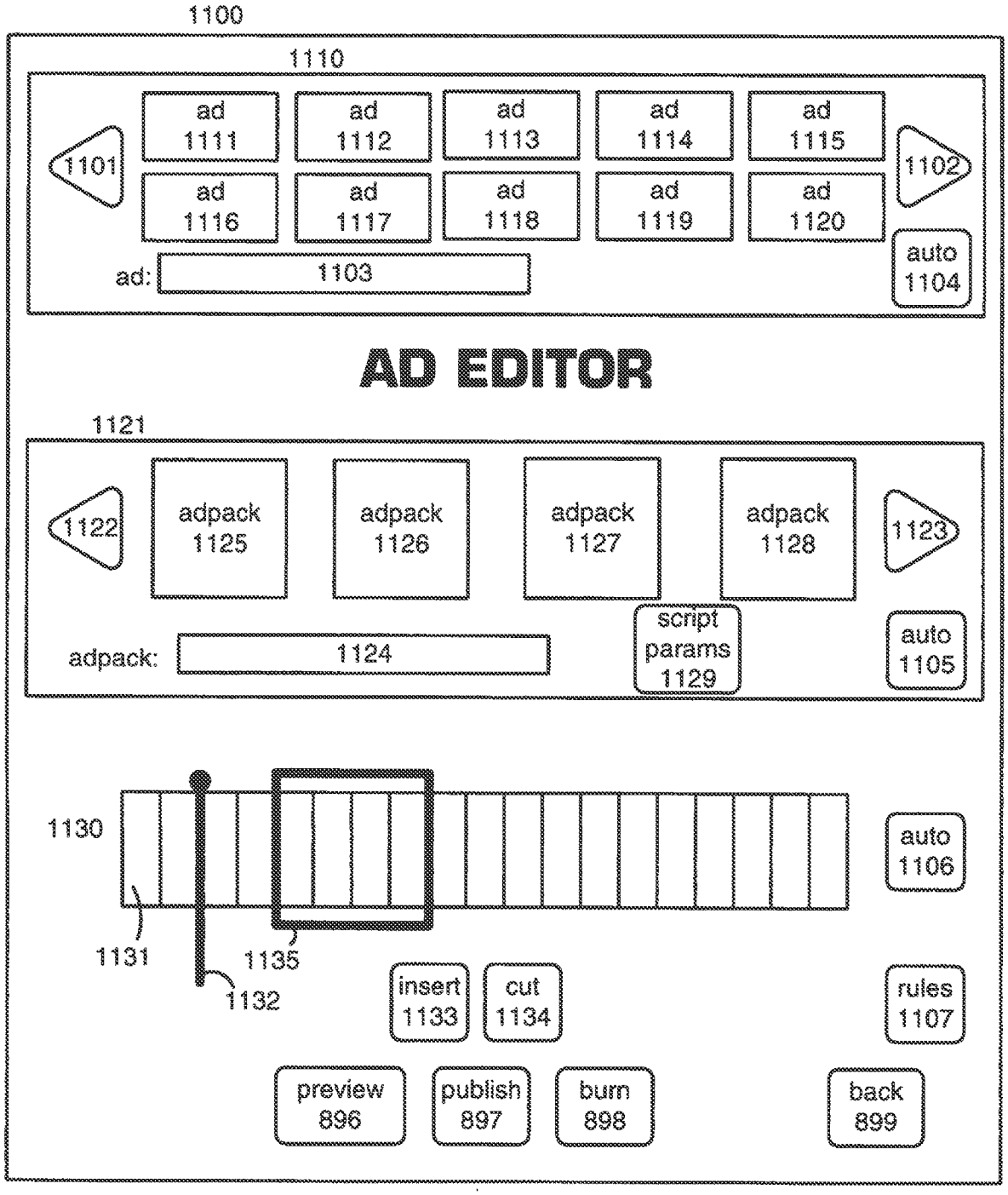

1100
1110
ad 1111
ad 1112
ad 1113
ad 1114
ad 1115
ad 1116
ad 1117
ad 1118
ad 1119
ad 1120
1101
1102
ad:
1103
auto 1104
AD EDITOR
1121
1122
adpack 1125
adpack 1126
adpack 1127
adpack 1128
1123
adpack:
1124
script params 1129
auto 1105
1130
auto 1106
1131
1132
1135
insert 1133
cut 1134
rules 1107
preview 896
publish 897
burn 898
back 899

Fig. 24

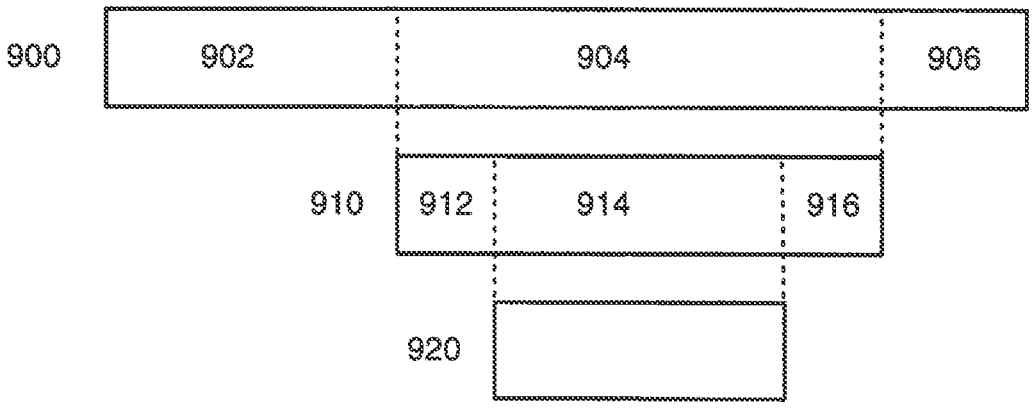


Fig. 25

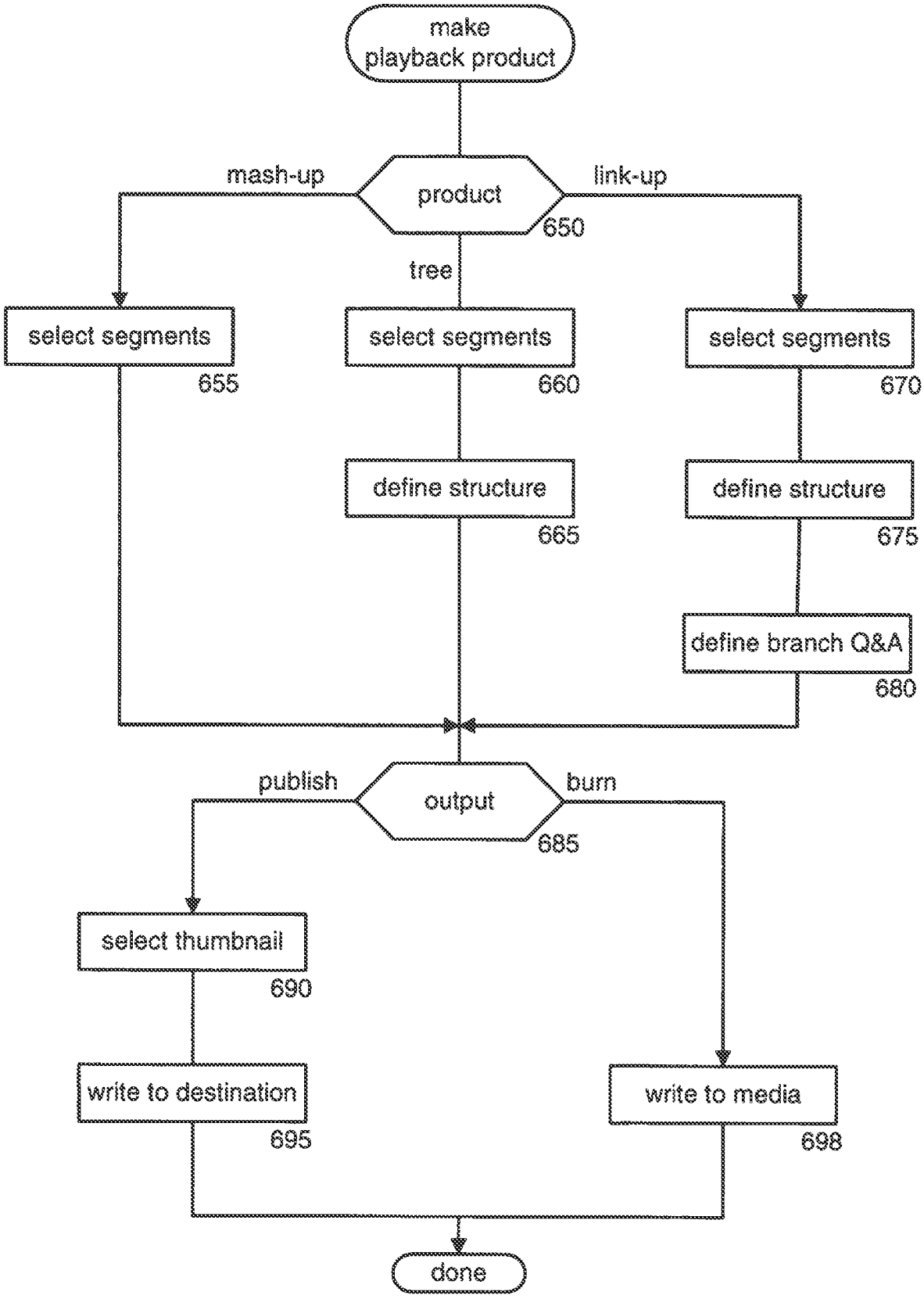

make playback product
mash-up
product
650
link-up
tree
select segments
655
select segments
660
select segments
670
define structure
665
define structure
675
define branch Q&A
680
publish
output
685
burn
select thumbnail
690
write to destination
695
write to media
698
done

Fig. 26

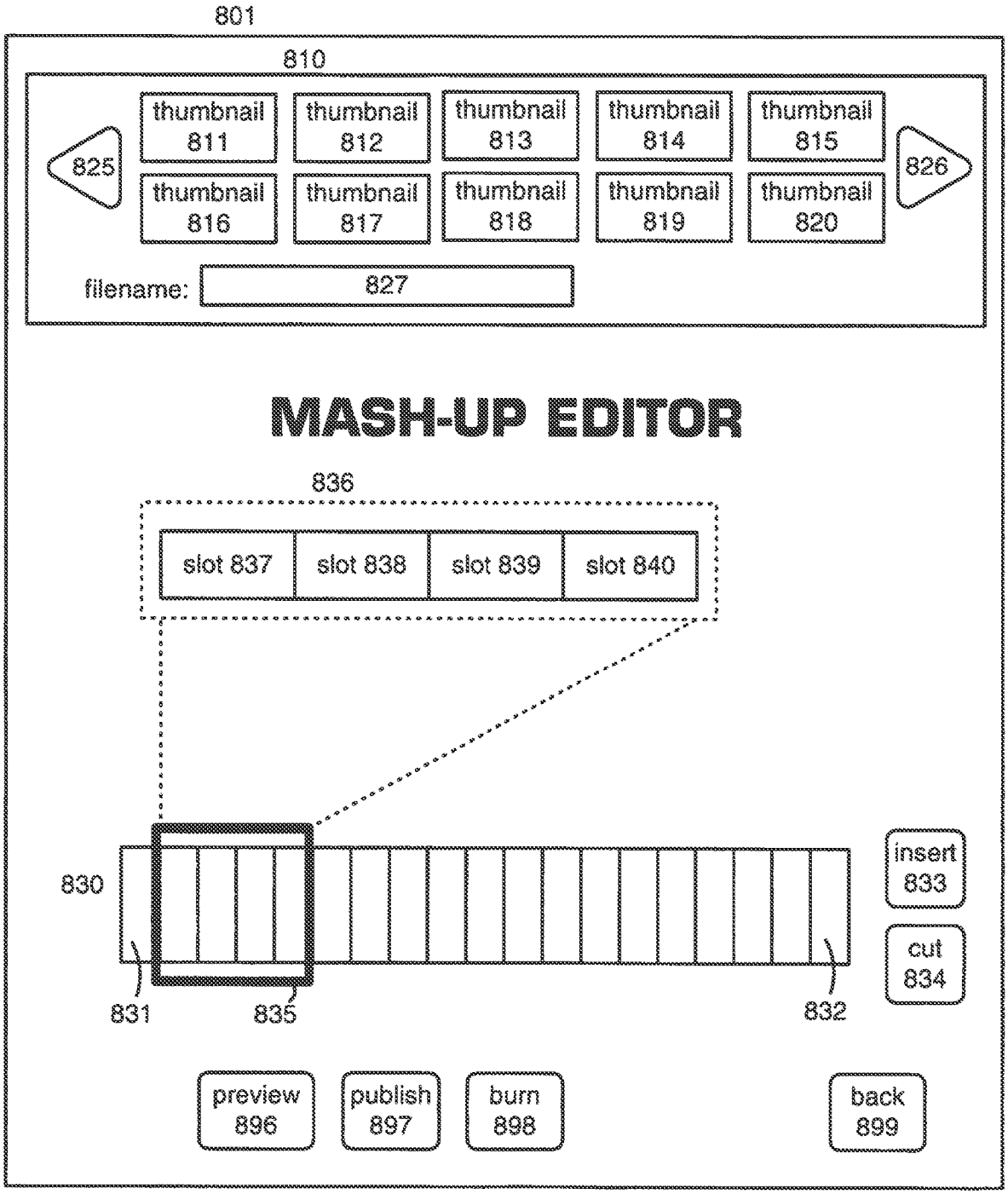

801
810
thumbnail 811
thumbnail 812
thumbnail 813
thumbnail 814
thumbnail 815
825
826
thumbnail 816
thumbnail 817
thumbnail 818
thumbnail 819
thumbnail 820
filename:
827
MASH-UP EDITOR
836
slot 837
slot 838
slot 839
slot 840
830
insert 833
cut 834
831
835
832
preview 896
publish 897
burn 898
back 899

Fig. 27

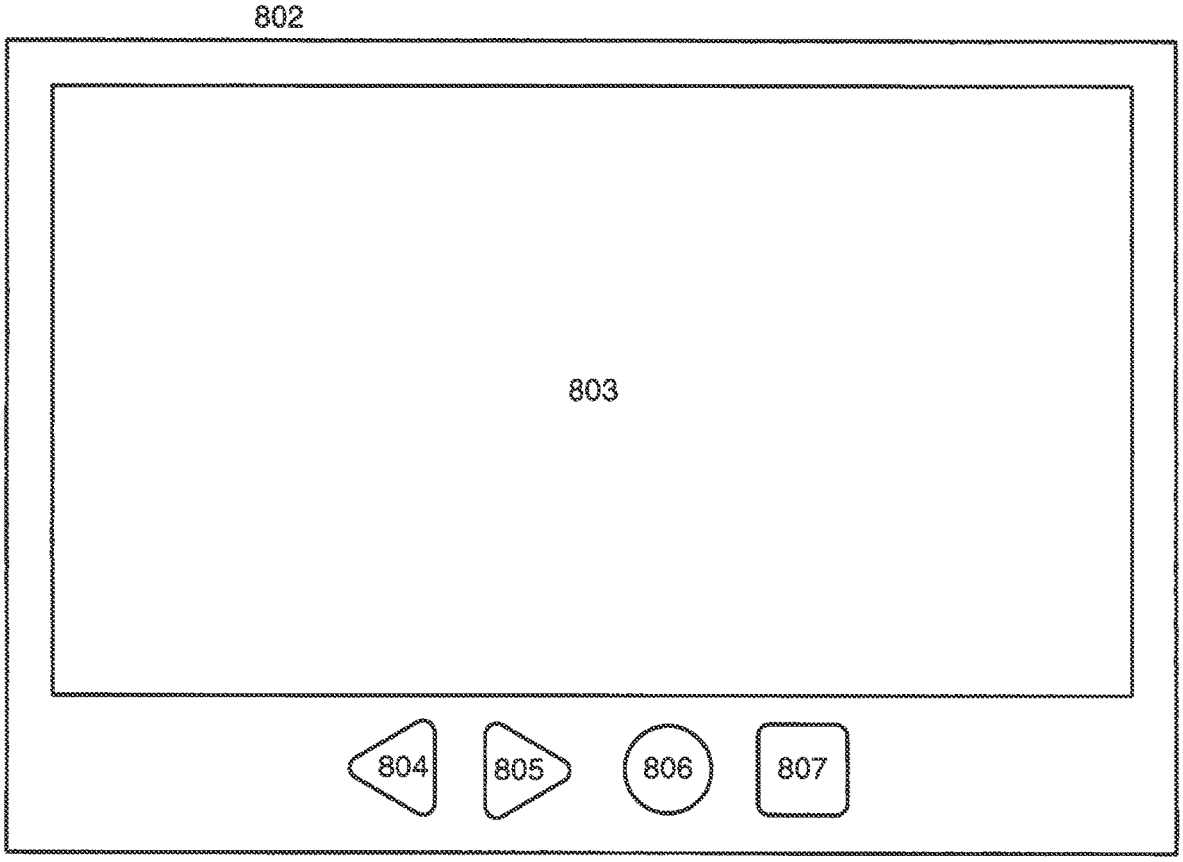


Fig. 28

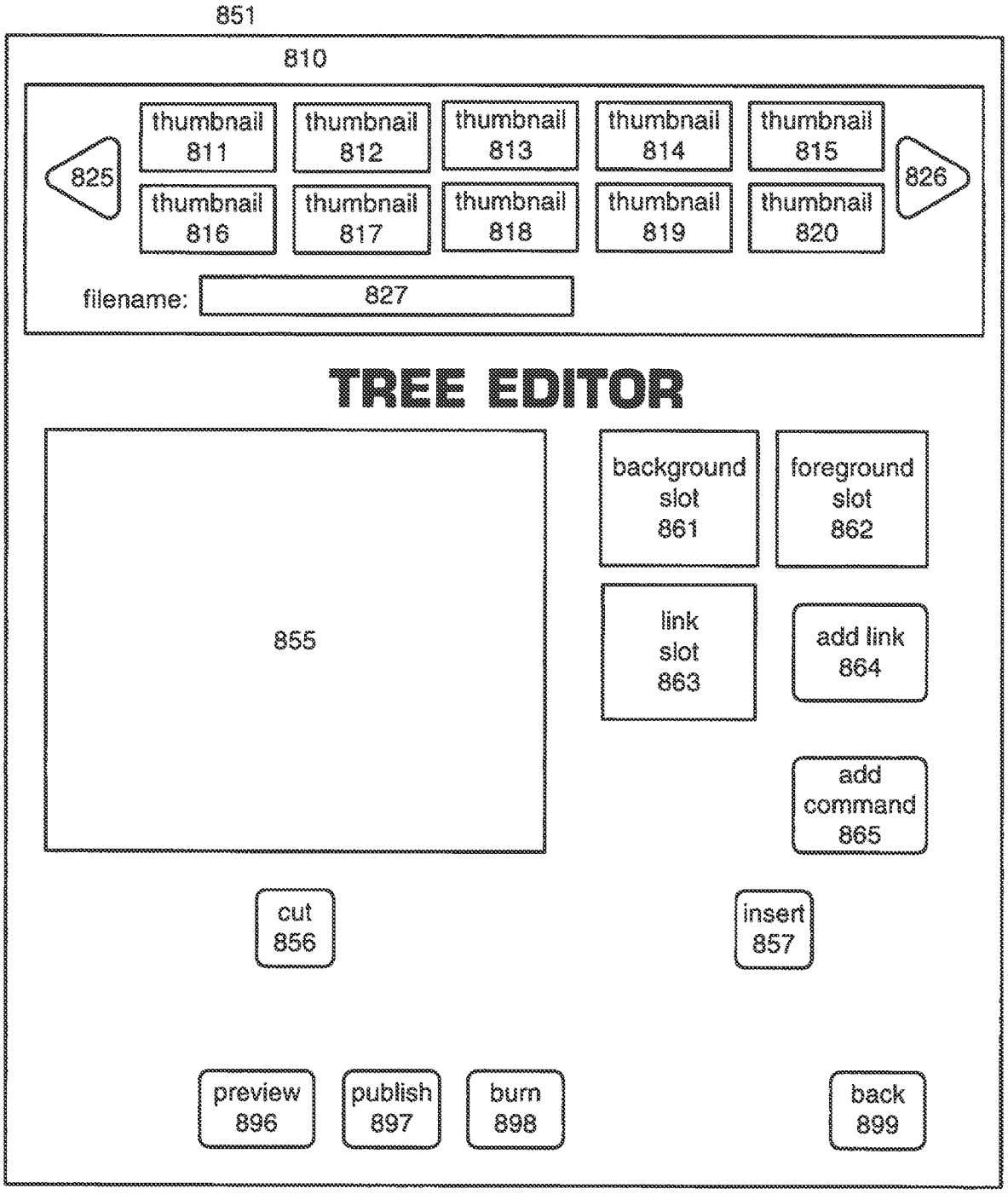

851
810
thumbnail 811
thumbnail 812
thumbnail 813
thumbnail 814
thumbnail 815
825
826
thumbnail 816
thumbnail 817
thumbnail 818
thumbnail 819
thumbnail 820
filename:
827
TREE EDITOR
855
background slot 861
foreground slot 862
link slot 863
add link 864
add command 865
cut 856
insert 857
preview 896
publish 897
burn 898
back 899

Fig. 29

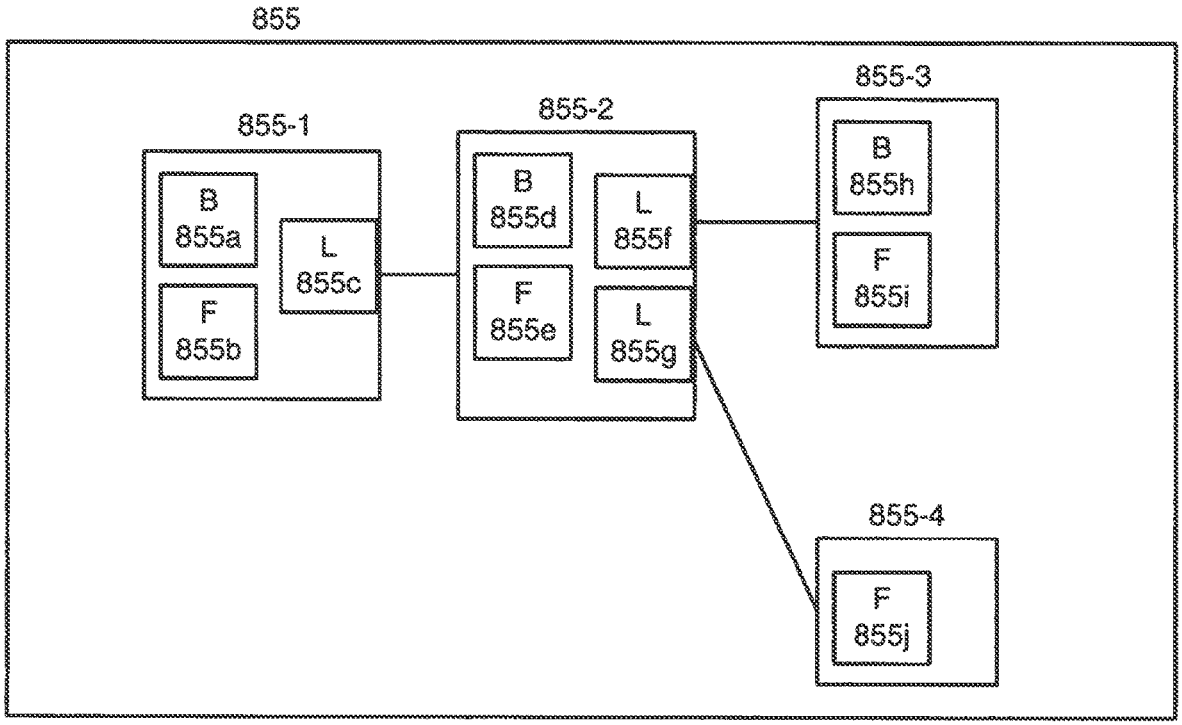

855
855-1
B
855a
F
855b
L
855c
855-2
B
855d
F
855e
L
855f
L
855g
855-3
B
855h
F
855i
855-4
F
855j

Fig. 30

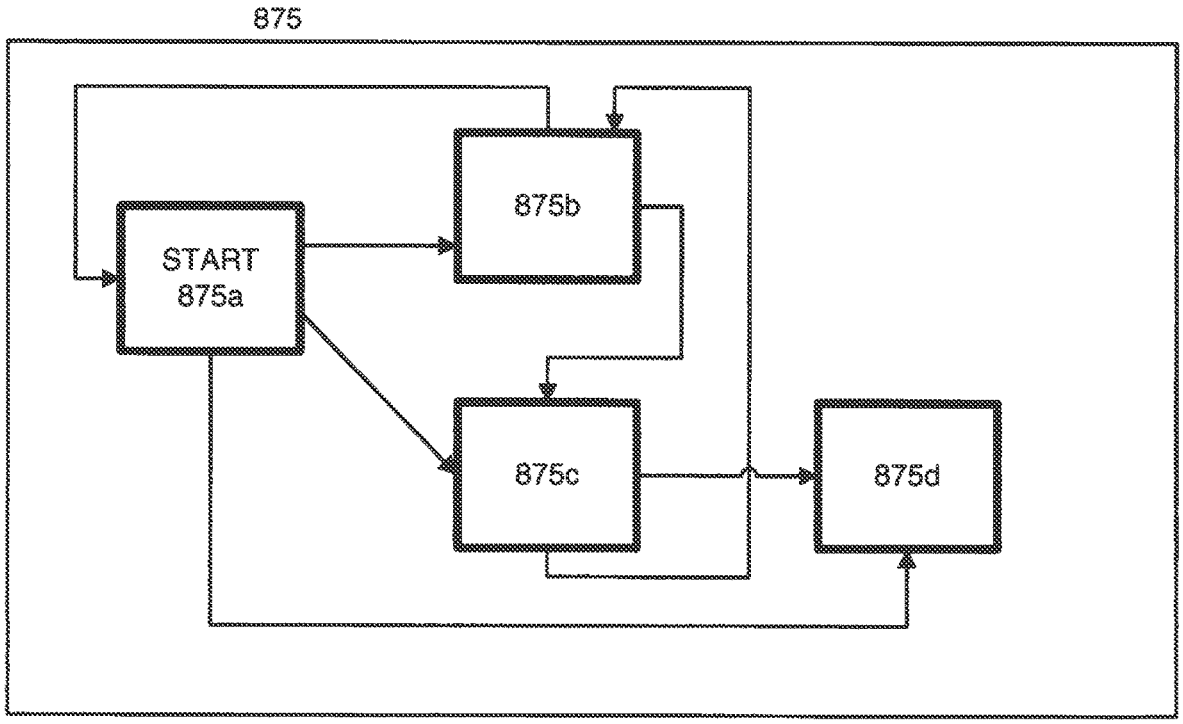

875
START
875a
875b
875c
875d

Fig. 32

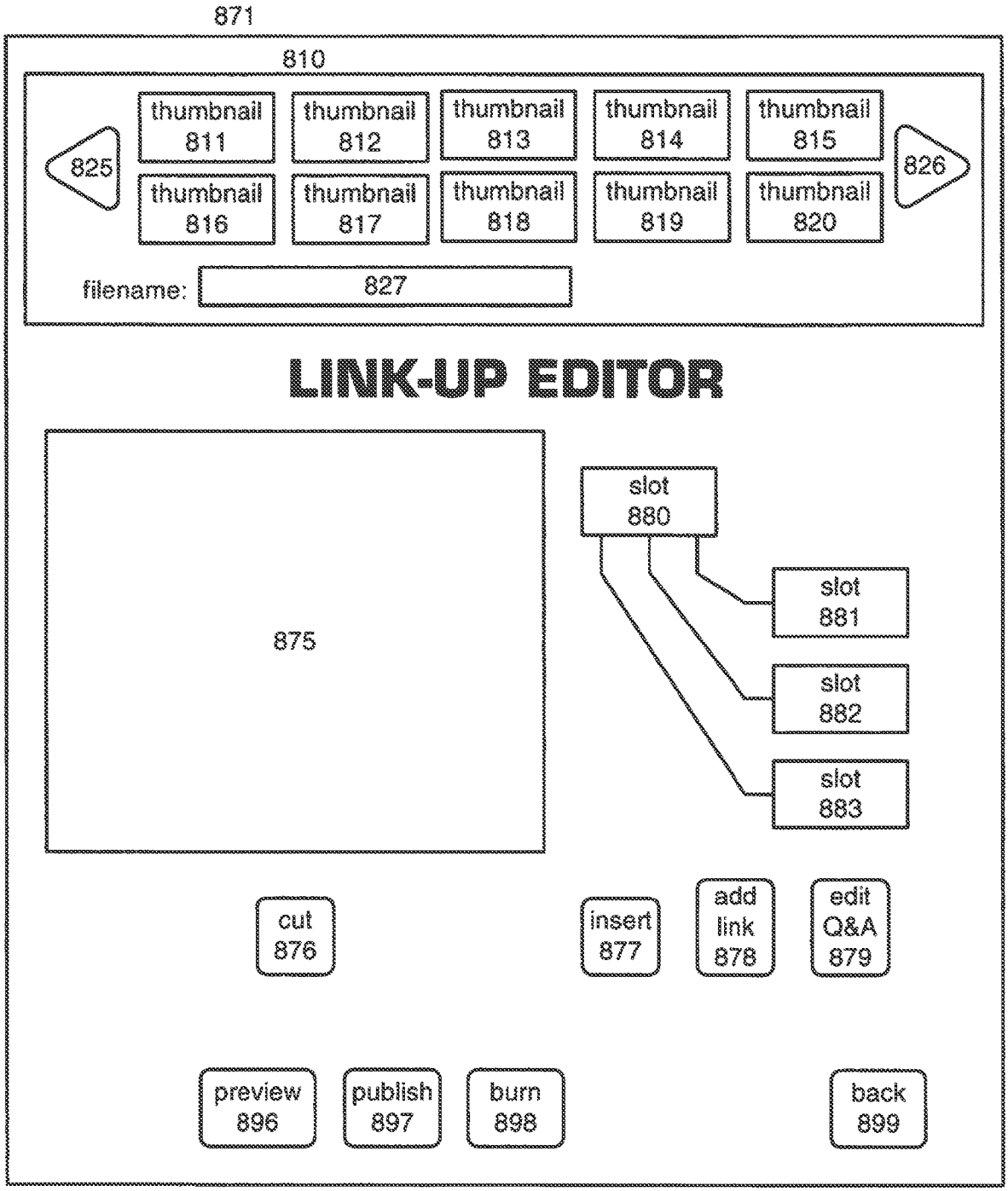

871
810
thumbnail 811
thumbnail 812
thumbnail 813
thumbnail 814
thumbnail 815
825
826
thumbnail 816
thumbnail 817
thumbnail 818
thumbnail 819
thumbnail 820
filename:
827
LINK-UP EDITOR
875
slot 880
slot 881
slot 882
slot 883
cut 876
insert 877
add link 878
edit Q&A 879
preview 896
publish 897
burn 898
back 899

Fig. 31

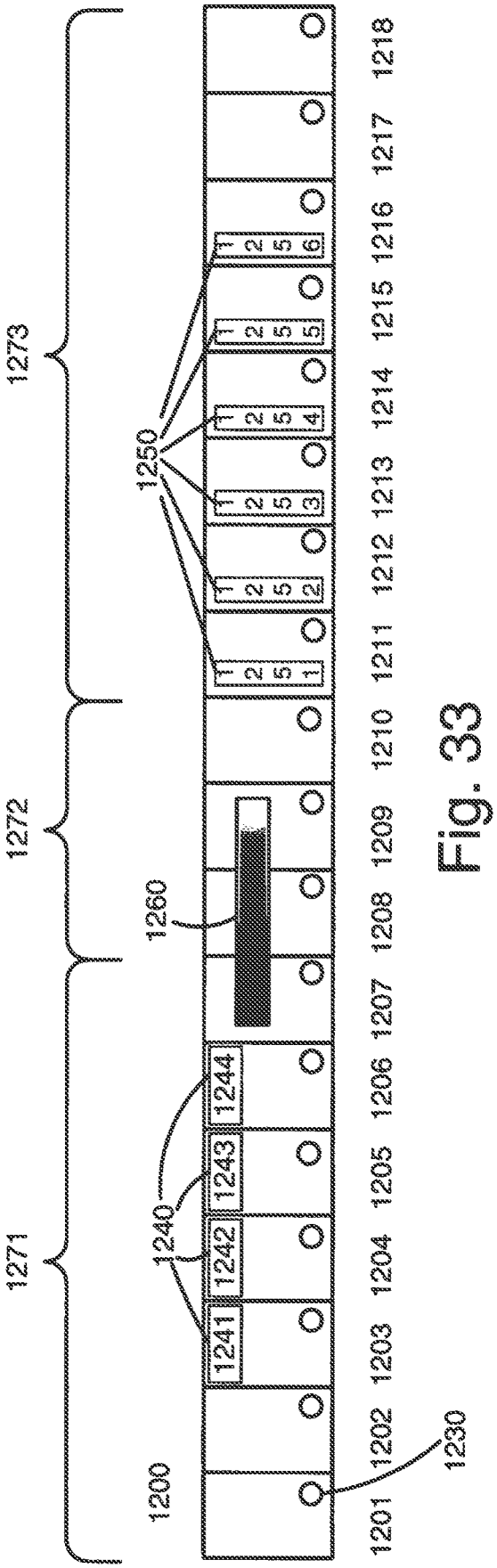

1273
1272
1271
1200
1201
1202
1203
1204
1205
1206
1207
1208
1209
1210
1211
1212
1213
1214
1215
1216
1217
1218
1230
1240
1241
1242
1243
1244
1250
1260

Fig. 33

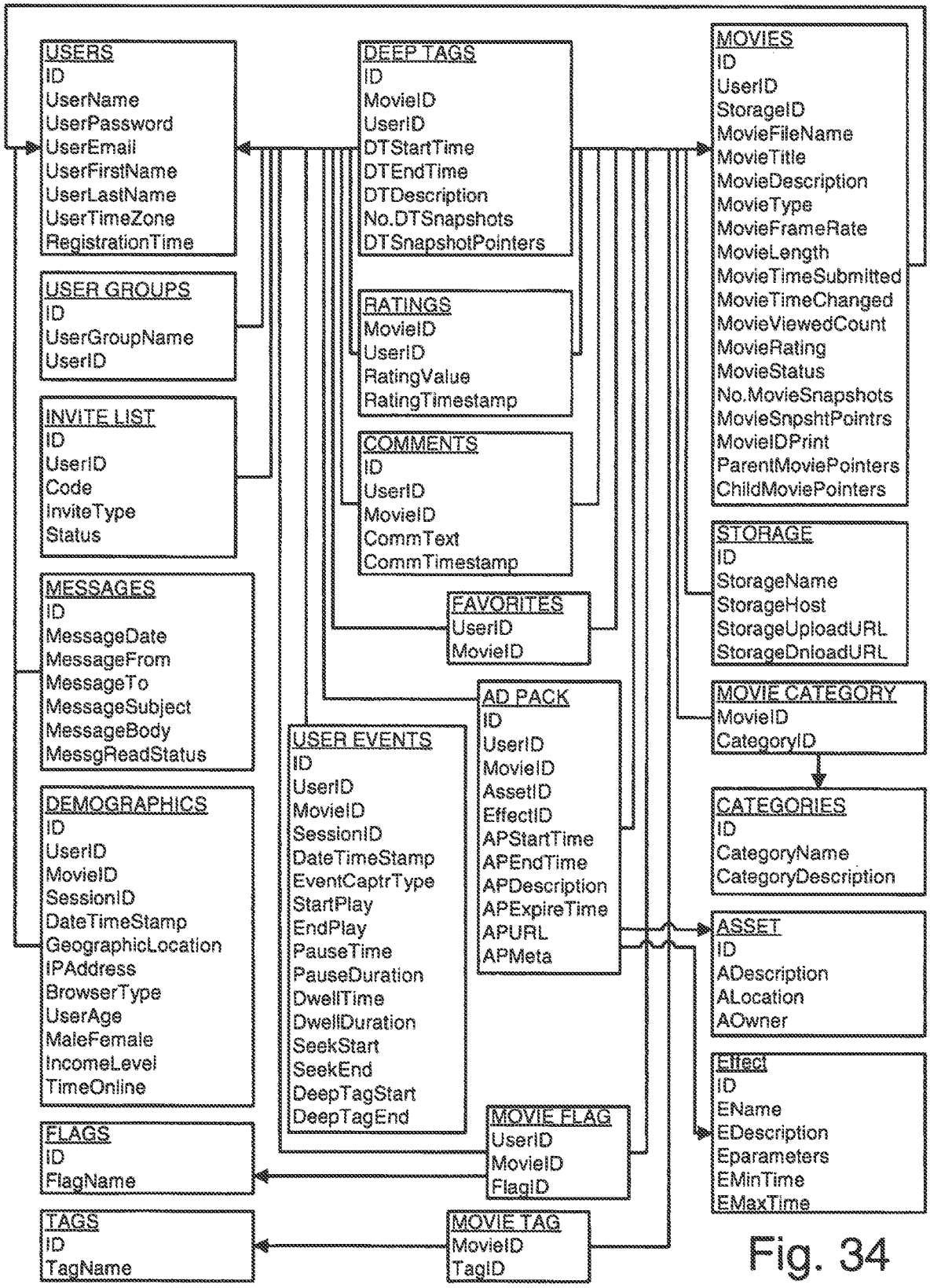

USERS
ID
UserName
UserPassword
UserEmail
UserFirstName
UserLastName
UserTimeZone
RegistrationTime
USER GROUPS
ID
UserGroupName
UserID
INVITE LIST
ID
UserID
Code
InviteType
Status
MESSAGES
ID
MessageDate
MessageFrom
MessageTo
MessageSubject
MessageBody
MessgReadStatus
DEMOGRAPHICS
ID
UserID
MovieID
SessionID
DateTimeStamp
GeographicLocation
IPAddress
BrowserType
UserAge
MaleFemale
IncomeLevel
TimeOnline
FLAGS
ID
FlagName
TAGS
ID
TagName
DEEP TAGS
ID
MovieID
UserID
DTStartTime
DTEndTime
DTDescription
No.DTSnapshots
DTSnapshotPointers
RATINGS
MovieID
UserID
RatingValue
RatingTimestamp
COMMENTS
ID
UserID
MovieID
CommText
CommTimestamp
FAVORITES
UserID
MovieID
USER EVENTS
ID
UserID
MovieID
SessionID
DateTimeStamp
EventCaptrType
StartPlay
EndPlay
PauseTime
PauseDuration
DwellTime
DwellDuration
SeekStart
SeekEnd
DeepTagStart
DeepTagEnd
AD PACK
ID
UserID
MovieID
AssetID
EffectID
APStartTime
APEndTime
APDescription
APExpireTime
APURL
APMeta
MOVIE FLAG
UserID
MovieID
FlagID
MOVIE TAG
MovieID
TagID
MOVIES
ID
UserID
StorageID
MovieFileName
MovieTitle
MovieDescription
MovieType
MovieFrameRate
MovieLength
MovieTimeSubmitted
MovieTimeChanged
MovieViewedCount
MovieRating
MovieStatus
No.MovieSnapshots
MovieSnpshtPointrs
MovieIDPrint
ParentMoviePointers
ChildMoviePointers
STORAGE
ID
StorageName
StorageHost
StorageUploadURL
StorageDnloadURL
MOVIE CATEGORY
MovieID
CategoryID
CATEGORIES
ID
CategoryName
CategoryDescription
ASSET
ID
ADescription
ALocation
AOwner
Effect
ID
EName
EDescription
Eparameters
EMinTime
EMaxTime

Fig. 34

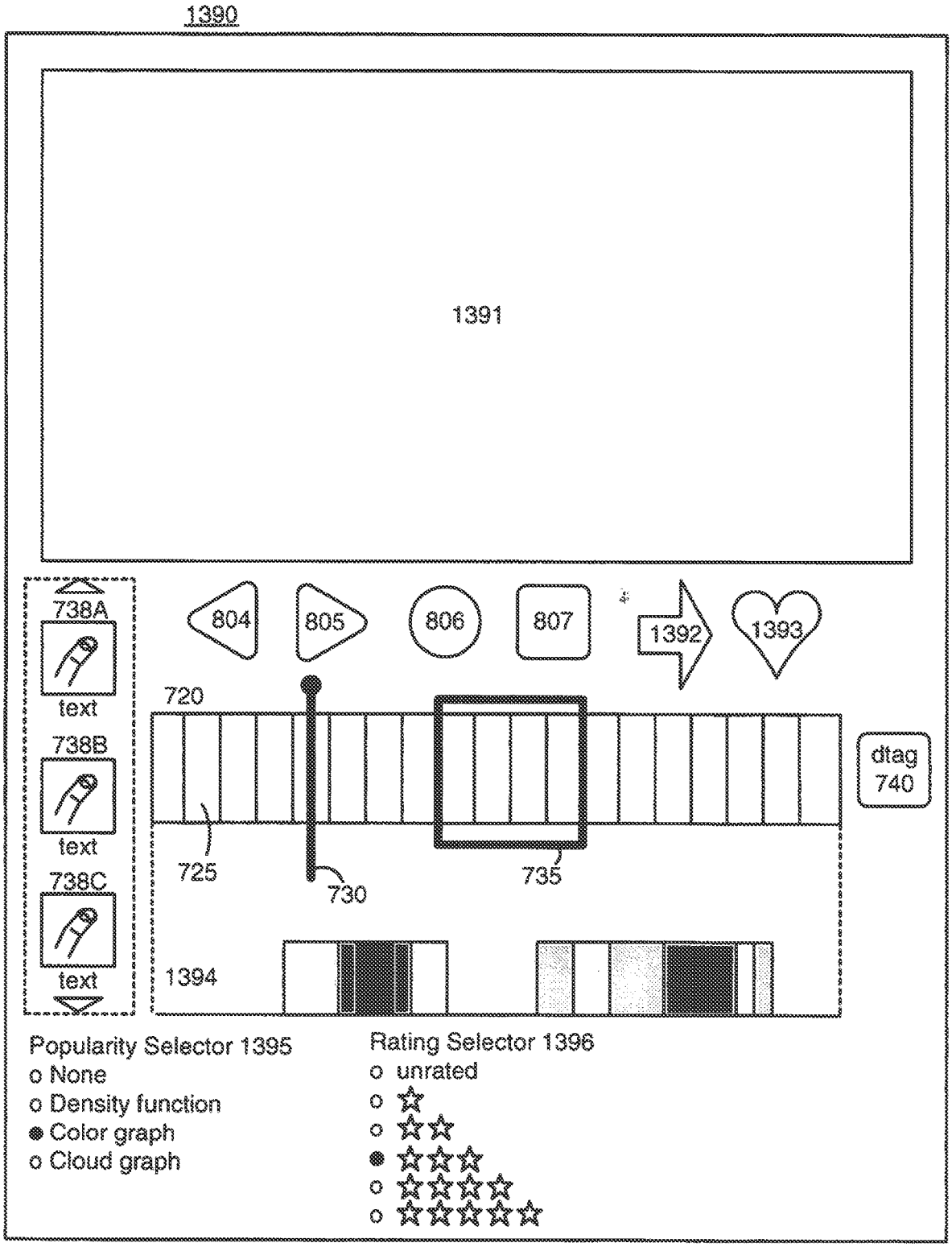

1390
1391
738A
text
738B
text
738C
text
804
805
806
807
1392
1393
720
725
730
735
dtag
740
1394
Popularity Selector 1395
o None
o Density function
● Color graph
o Cloud graph
Rating Selector 1396
o unrated
o ☆
o ☆☆
● ☆☆☆
o ☆☆☆☆
o ☆☆☆☆☆

Fig. 35

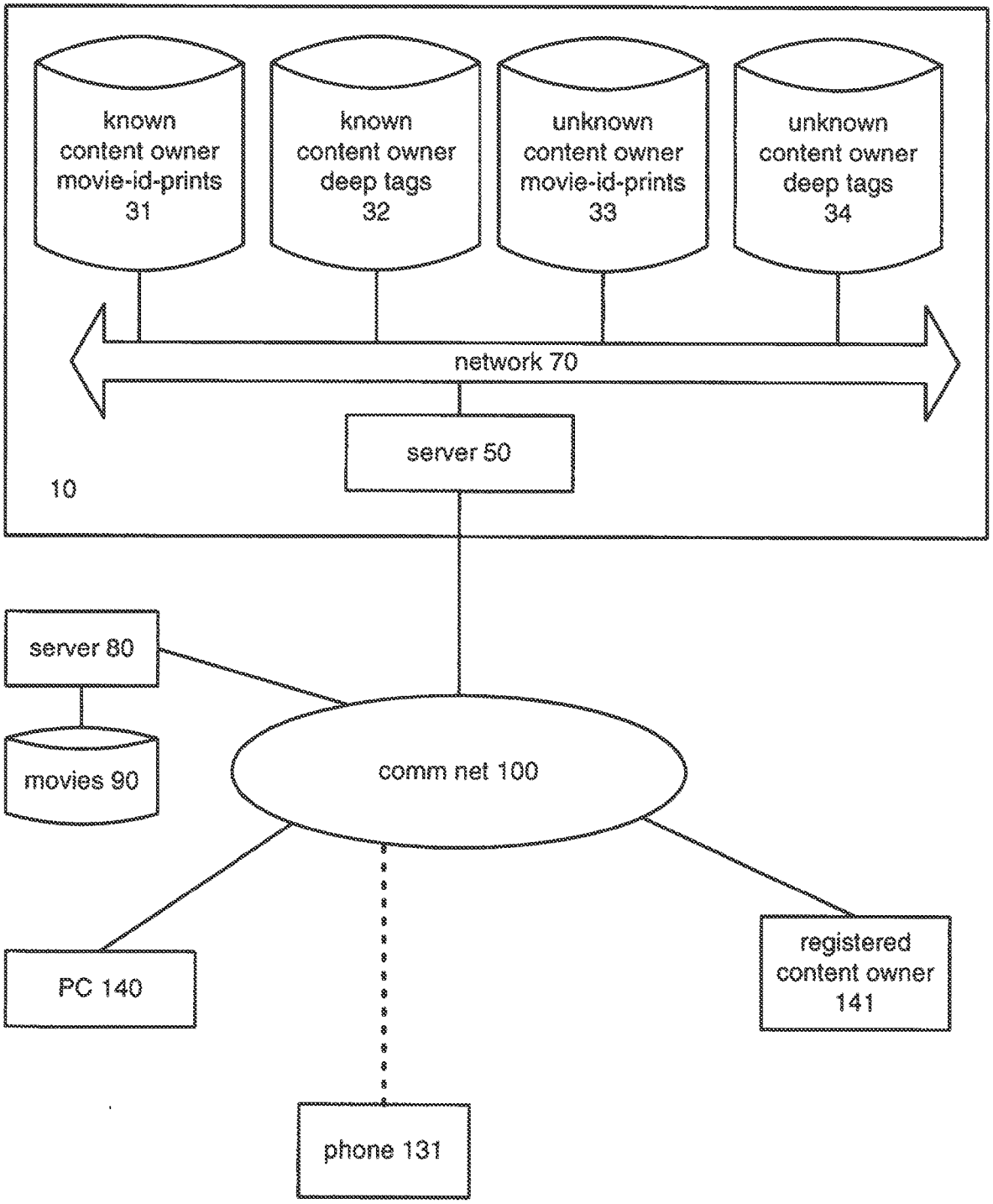
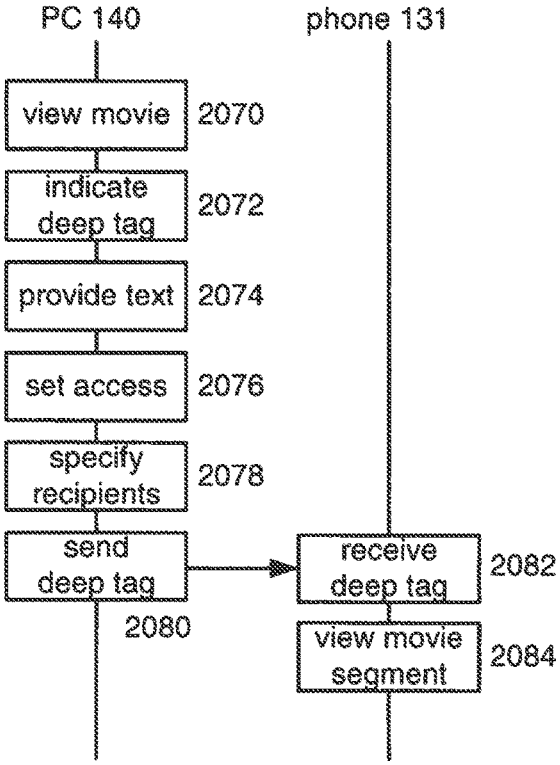

known content owner movie-id-prints 31
known content owner deep tags 32
unknown content owner movie-id-prints 33
unknown content owner deep tags 34
network 70
server 50
10
server 80
movies 90
comm net 100
PC 140
registered content owner 141
phone 131

Fig. 36

Fig. 37



2110

DEEP TAG, Known Content Owner
ID
MovieID
UserID
DTStartTime
DTEndTime
DTDescription
No.DTSnapshots
DTSnapshotPointers

Fig. 38A

2120

DEEP TAG, Unknown Content Owner
ID
MovieID
Movie-ID-print
UserID
DTStartTime
DTEndTime
DTDescription
No.DTSnapshots
DTSnapshotPointers
DTCreationDateTime
(Sender1,Recipient1,FirstViewDate1)
DT1Description
(Sender2,Recipient2,FirstViewDate2)
(Sender3,Recipient3,FirstViewDate3)
(Sender4,Recipient4,FirstViewDate4)
DT4Description
(Sender5,Recipient5,FirstViewDate5)

Fig. 38B

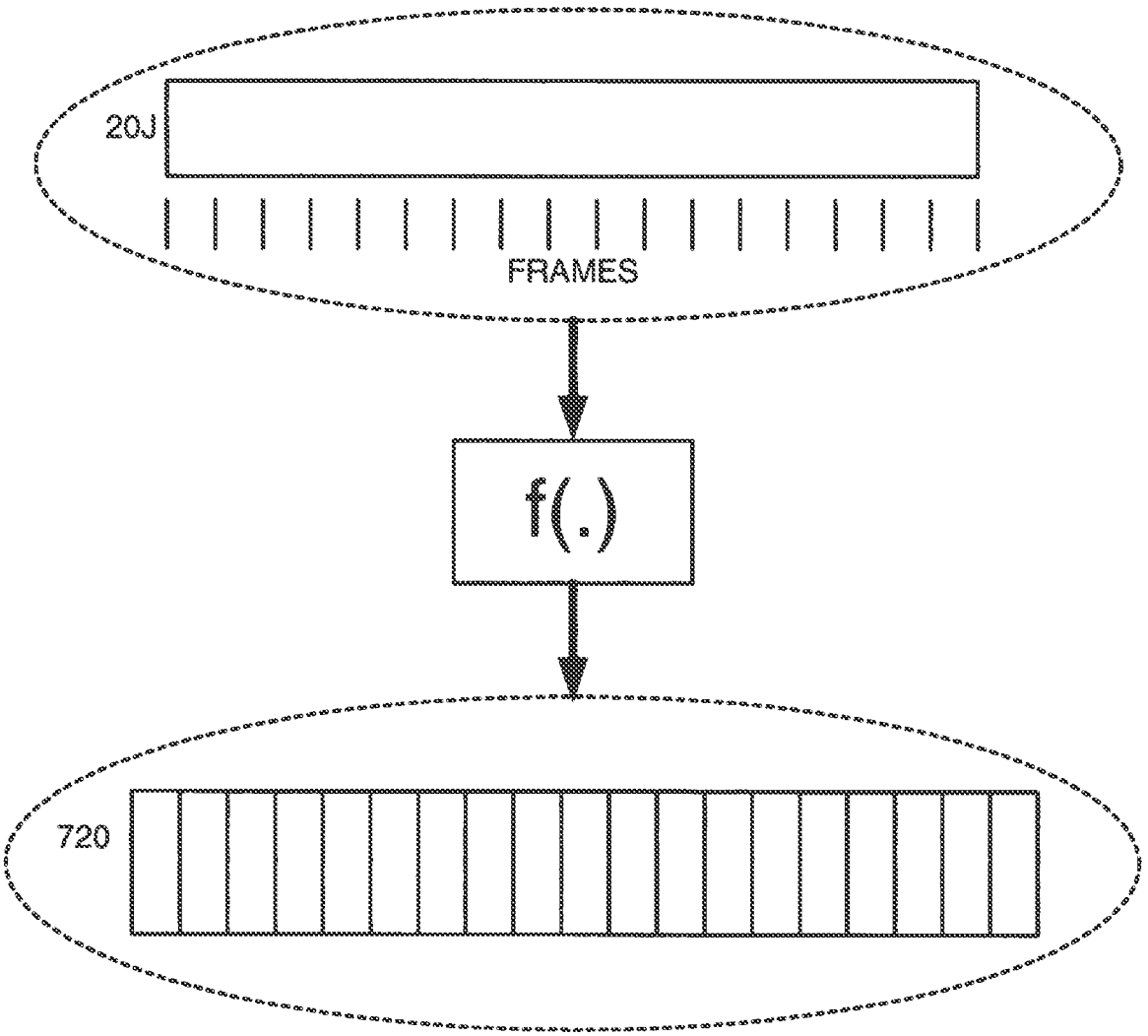
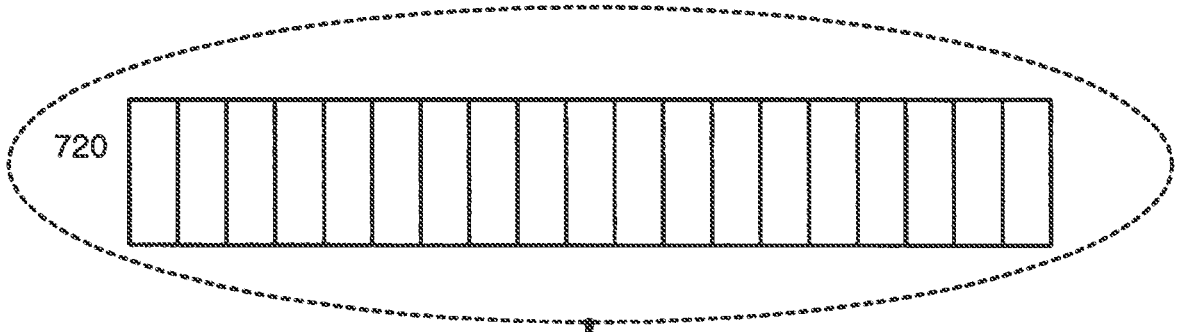


Fig. 39



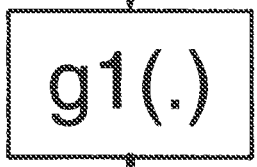
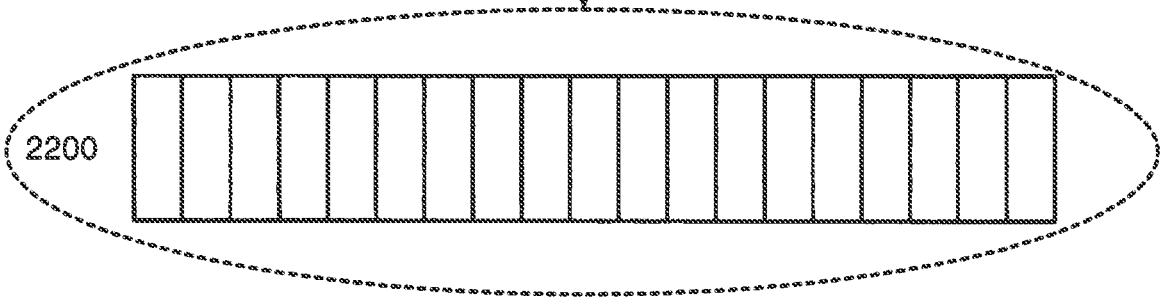
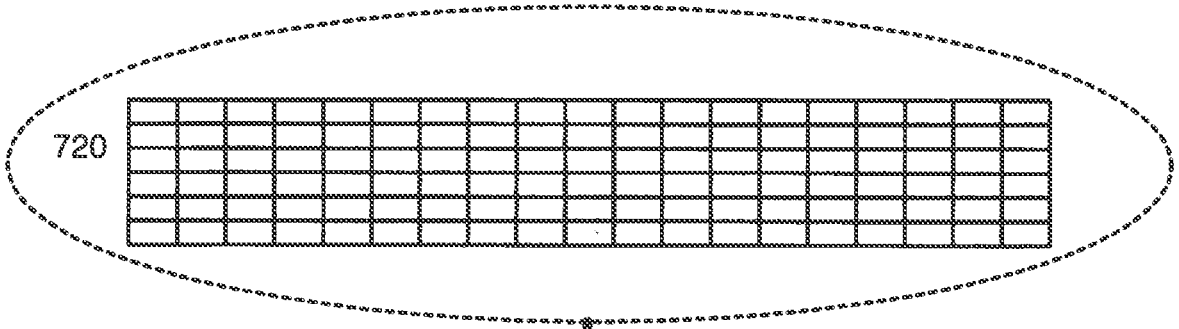


Fig. 40A





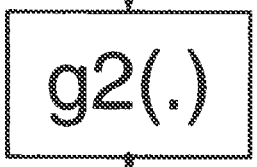
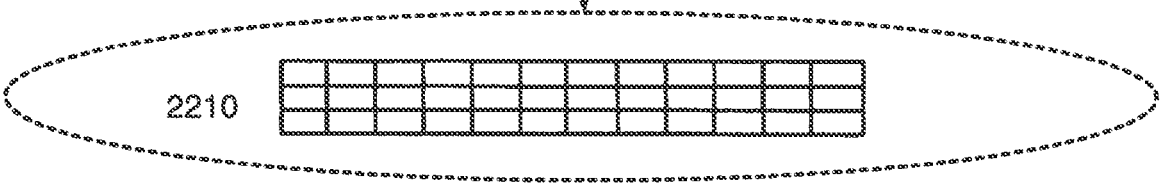


Fig. 40B



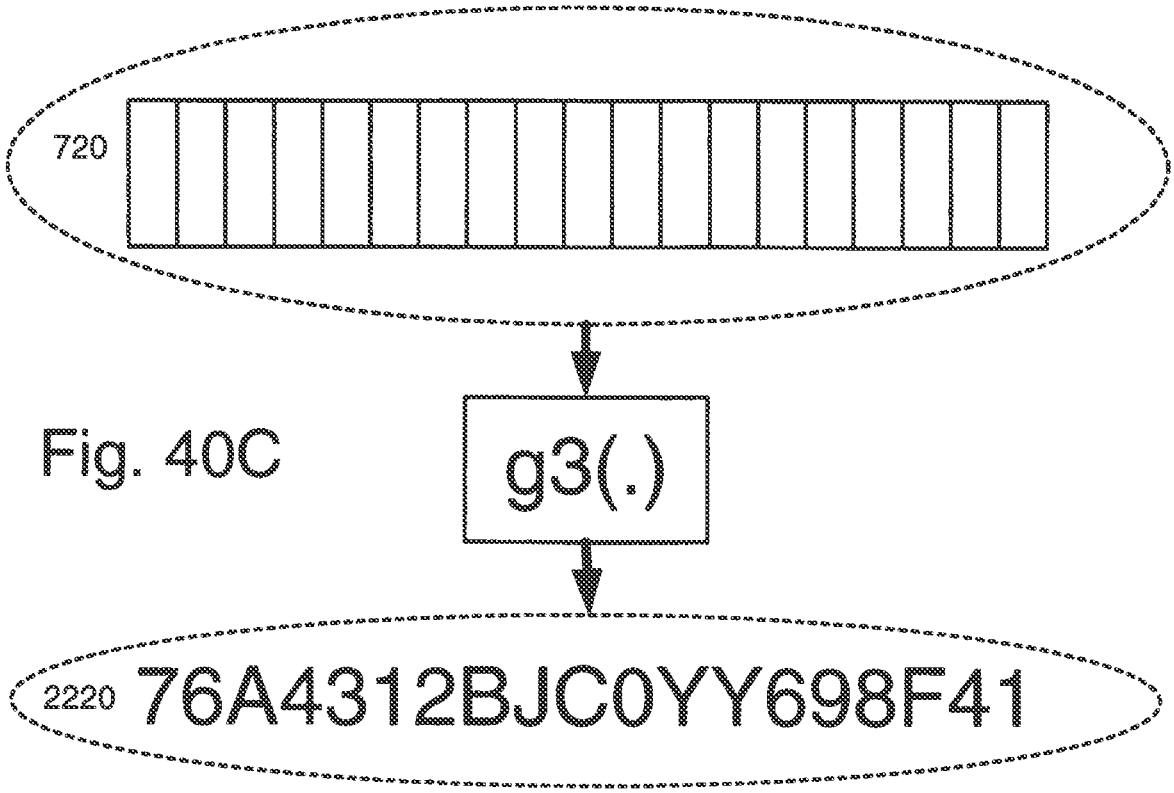


Fig. 40C

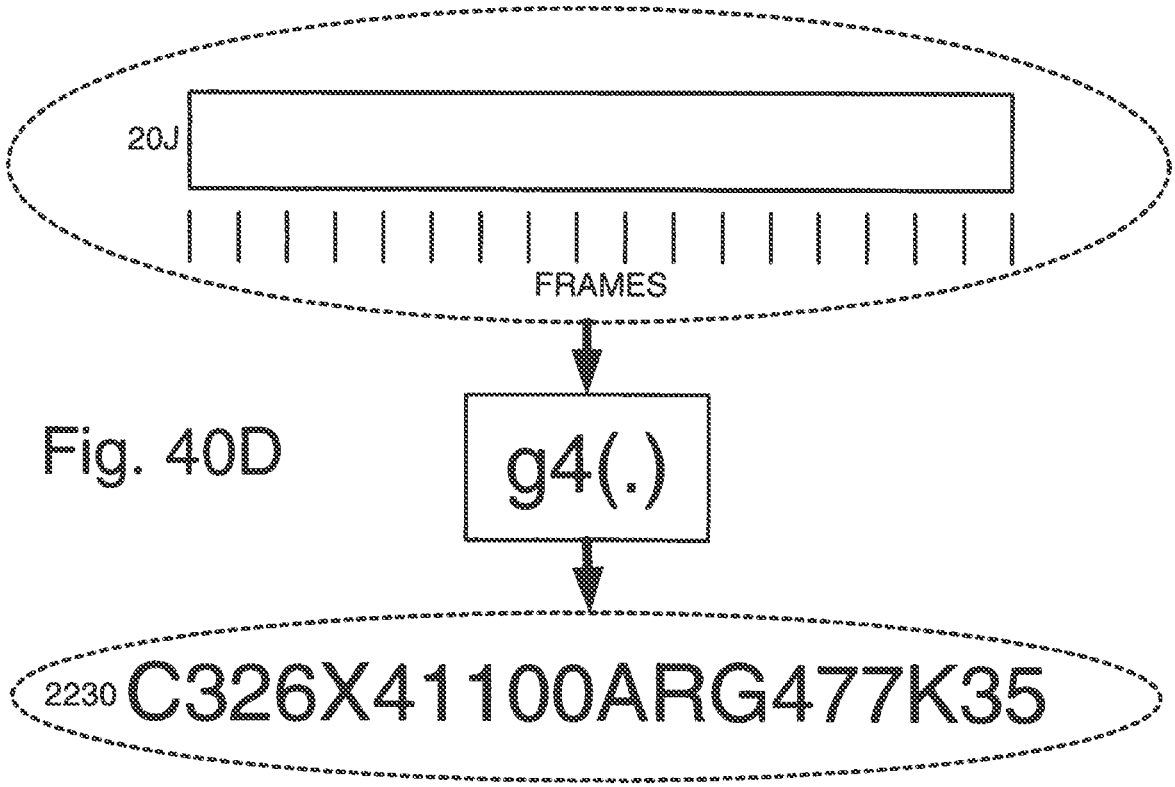


Fig. 40D

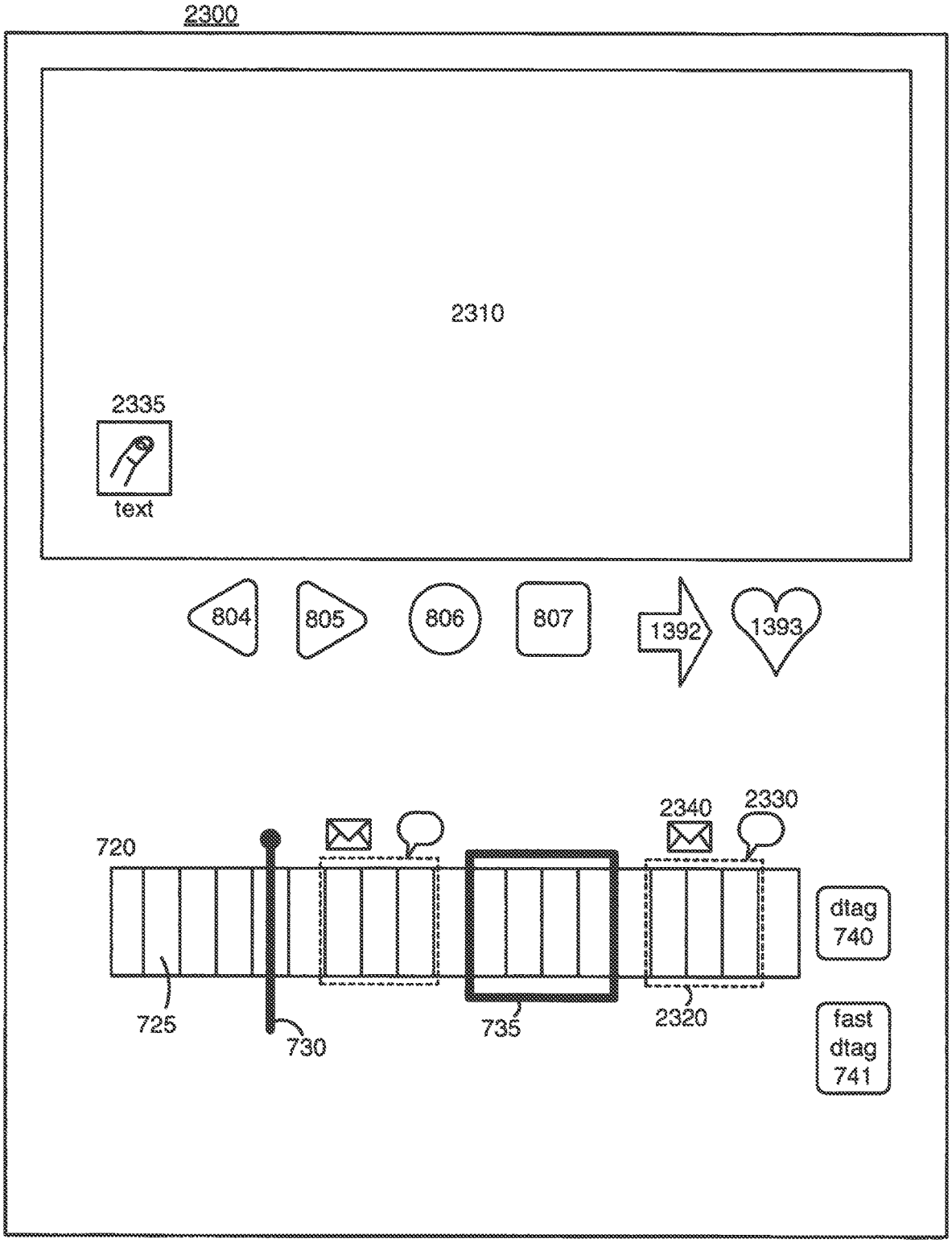

2300
2310
2335
text
804
805
806
807
1392
1393
720
2340
2330
dtag
740
725
730
735
2320
fast
dtag
741

Fig. 41

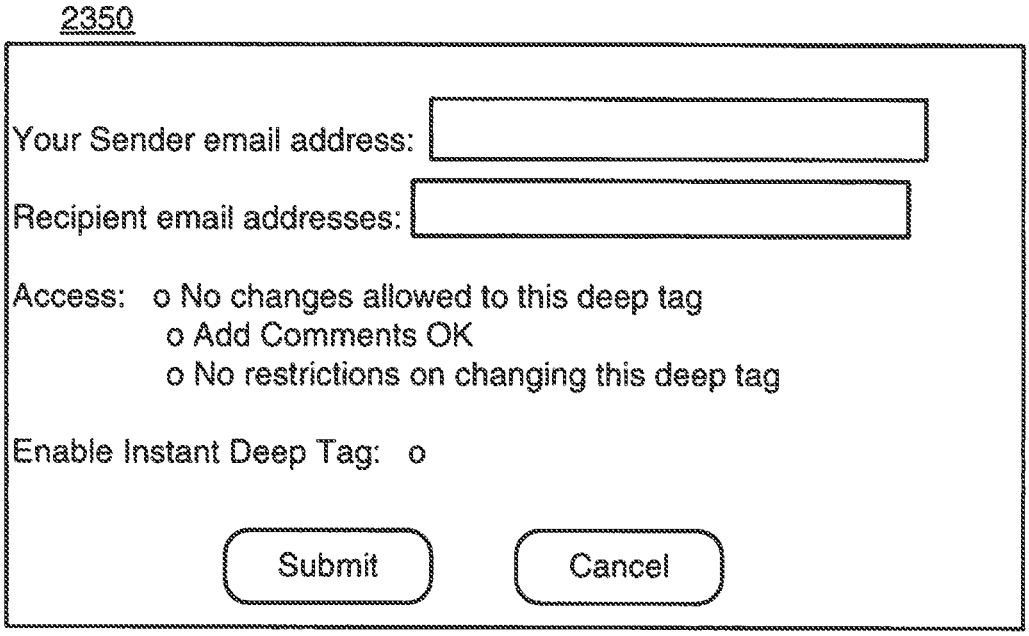

2350
Your Sender email address:
Recipient email addresses:
Access: o No changes allowed to this deep tag
o Add Comments OK
o No restrictions on changing this deep tag
Enable Instant Deep Tag: o
Submit
Cancel

Fig. 42

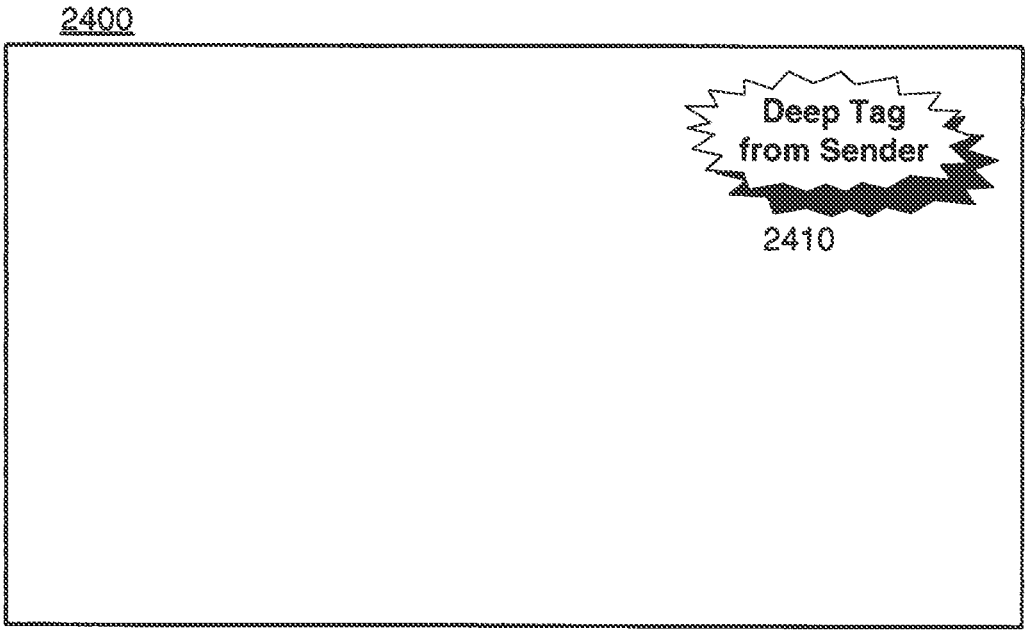

2400
Deep Tag from Sender
2410

Fig. 43

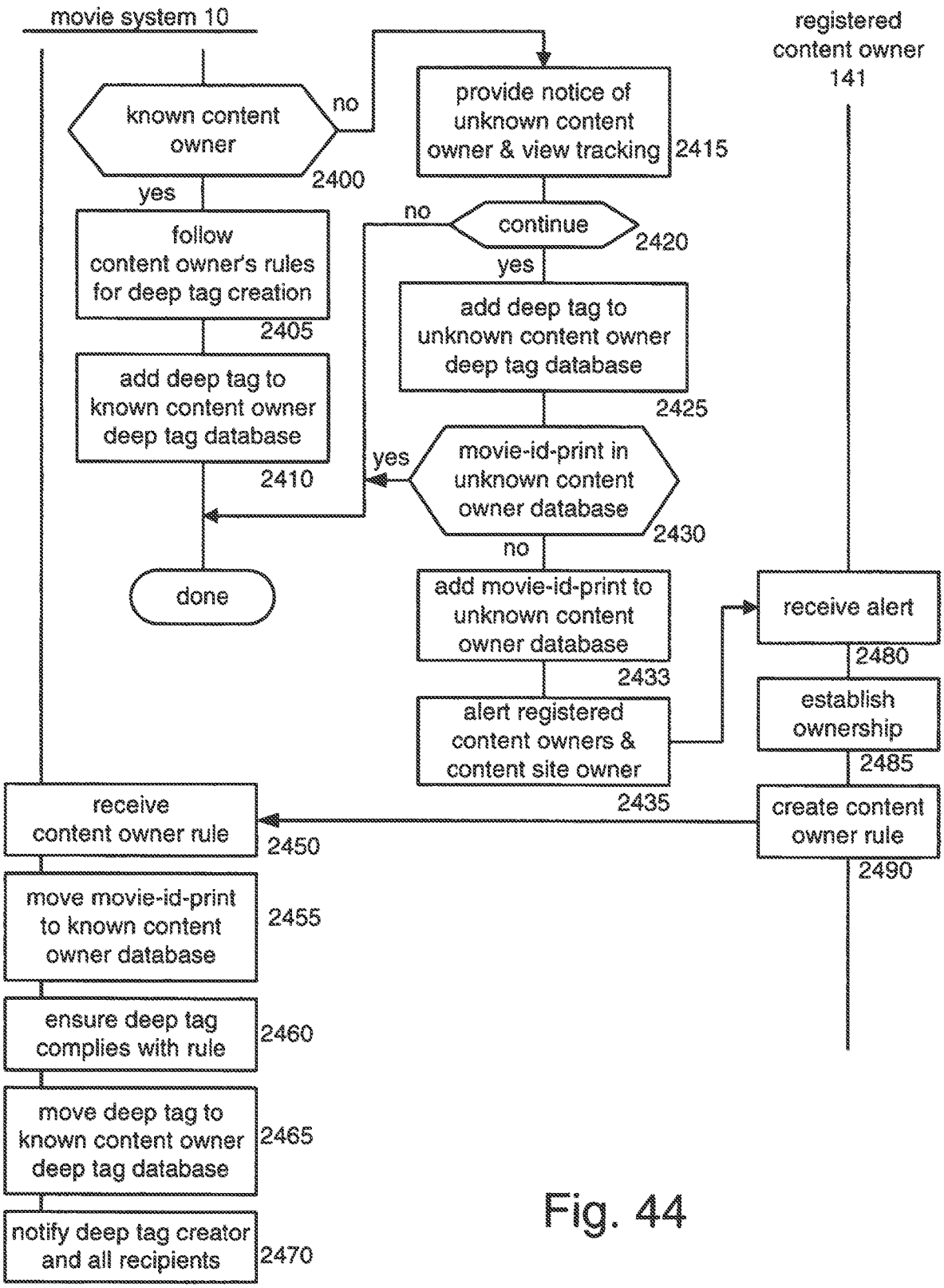

movie system 10
registered content owner 141
known content owner
no
yes
2400
provide notice of unknown content owner & view tracking
2415
follow content owner's rules for deep tag creation
2405
add deep tag to known content owner deep tag database
2410
done
no
continue
2420
yes
add deep tag to unknown content owner deep tag database
2425
yes
movie-id-print in unknown content owner database
2430
no
add movie-id-print to unknown content owner database
2433
alert registered content owners & content site owner
2435
receive alert
2480
establish ownership
2485
create content owner rule
2490
receive content owner rule
2450
move movie-id-print to known content owner database
2455
ensure deep tag complies with rule
2460
move deep tag to known content owner deep tag database
2465
notify deep tag creator and all recipients
2470

Fig. 44

SYSTEM AND METHOD FOR MOVIE SEGMENT BOOKMARKING AND SHARING

CROSS-REFERENCE TO RELATED APPLICATIONS

This is a continuation of U.S. patent application Ser. No. 17/209,101, filed Mar. 22, 2021, now U.S. Pat. No. 11,381,779, entitled "SYSTEM AND METHOD FOR MOVIE SEGMENT BOOKMARKING AND SHARING," which is a continuation of U.S. patent application Ser. No. 16/744,840, filed Jan. 16, 2020, now U.S. Pat. No. 10,958,876, entitled "SYSTEM AND METHOD FOR MOVIE SEGMENT BOOKMARKING AND SHARING," which is a continuation of U.S. patent application Ser. No. 15/365,308, filed Nov. 30, 2016, now U.S. Pat. No. 10,594,981, entitled "SYSTEM AND METHOD FOR MOVIE SEGMENT BOOKMARKING AND SHARING," which is a continuation of U.S. patent application Ser. No. 11/713,115, filed Feb. 27, 2007, now U.S. Pat. No. 9,648,281, entitled "SYSTEM AND METHOD FOR MOVIE SEGMENT BOOKMARKING AND SHARING," which is a continuation-in-part of U.S. patent application Ser. No. 11/592,901, filed Nov. 3, 2006, now U.S. Pat. No. 8,145,528, entitled "MOVIE ADVERTISING PLACEMENT OPTIMIZATION BASED ON BEHAVIOR AND CONTENT ANALYSIS," which is a continuation-in-part of U.S. patent application Ser. No. 11/439,600, filed May 23, 2006, now U.S. Pat. No. 8,755,673, entitled "METHOD, SYSTEM AND COMPUTER PROGRAM PRODUCT FOR EDITING MOVIES IN DISTRIBUTED SCALABLE MEDIA ENVIRONMENT," of U.S. patent application Ser. No. 11/439,594, filed May 23, 2006, now U.S. Pat. No. 8,724,969, entitled "METHOD, SYSTEM AND COMPUTER PROGRAM PRODUCT FOR EDITING MOVIES IN DISTRIBUTED SCALABLE MEDIA ENVIRONMENT," and of U.S. patent application Ser. No. 11/439,593, filed May 23, 2006, now U.S. Pat. No. 7,877,689, entitled "DISTRIBUTED SCALABLE MEDIA ENVIRONMENT FOR MOVIE ADVERTISING PLACEMENT IN USER-CREATED MOVIES," which claim a benefit of priority from U.S. Provisional Application No. 60/683,662, filed May 23, 2005, entitled "DISTRIBUTED SCALABLE MEDIA ENVIRONMENT." All applications referenced in this paragraph are fully incorporated herein in their entireties.

BACKGROUND OF THE RELATED ART

The invention relates to processing recorded video and audio, and more specifically, to techniques for determining where in a movie to insert an ad.

Linear media editing systems used for analog audio, video tape and photographic film are manual, time consuming and cumbersome to reduce content into a final form and distribute. In more recent times computer systems allow for time efficient non-linear video editing systems. Current non-linear editing on computer oriented systems involves capturing media content permitting rapid access to the media content at any point in the linear sequence for moving portions into any order and storing the media content on a storage device, such as a magnetic disk drive or digital versatile disk (DVD).

The average person currently has small set of alternatives for editing content from media capture devices such as camcorders, camera phones, audio recorders, and other media capture devices without having to incur the costs of a computer system and software for editing. In addition, non-linear editing systems are complex and very difficult to use.

People capture various random and personally interesting events, such as work, travel and entertainment event using their camcorders or camera phones. To edit this content, people require easy to use non-linear editing systems that facilitate editing without a high degree of computer or editing skill.

Media content storage technologies provide for storing great amounts of interactive multimedia, for example, the DVD format. Unfortunately, the DVD Specification for authoring is very complex, as are the computer systems that attempt to embody it. A further disadvantage of conventional DVD authoring systems is that they provide a DVD author with only minimal control and flexibility.

The process of authoring a DVD includes a number of complex steps and equipment. Accordingly, there is a need for authoring systems and methods that reduces the time, cost and complexity of the authoring and distributing DVD.

Separate and distinct systems for computer based non-linear editing, DVD authoring, and distributions are known. However, no system exists that enables an ad to be flexibly placed in different areas of a movie according to an automatic procedure.

SUMMARY OF THE INVENTION

In accordance with the present invention, there is provided a method for enabling a viewer to create a deep tag for a segment of a movie. An indicator for generating the deep tag representing the segment of the movie is provided. An actuation of the indicator is received from the viewer. A deep tag corresponding to the actuation of the indicator is created and stored.

In some cases, descriptive text provided by the viewer is associated with the deep tag, and the deep tag is sent to at least one address provided by the viewer.

It is not intended that the invention be summarized here in its entirety. Rather, further features, aspects and advantages of the invention are set forth in or are apparent from the following description and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a configuration diagram for one embodiment of the present invention wherein the transcoder is used via a public communication network;

FIGS. **2**A and **2**B are configuration diagrams for other embodiments of the present invention wherein the transcoder resides locally;

FIG. **3** is an event chart showing distribution and collection of work for a PC-based transcoder using a peer-to-peer network;

FIGS. **4**A-**4**C are configuration diagrams for embodiments of the present invention wherein the transcoder resides locally;

FIGS. **5**A-**5**D are charts illustrating various forms of static and proxy ad placement in a movie;

FIG. **6** is an event chart illustrating proxy ad delivery;

FIGS. **7** and **8** are flowcharts depicting high-level operation of movie uploading and downloading, respectively;

FIG. **9** is a flowchart depicting a high level ad placement procedure;

FIG. **10** is a flowchart depicting transcoder operation during movie creation;

FIG. **11** is a diagram of a user interface for editing a movie;

FIG. **12** is a diagram showing an effects and scripts editor interface;

FIG. **13** is a flowchart illustrating collection and processing of usage statistics;

FIG. **14** is a timeline illustrating sample play events;

FIG. **15** is a data structure representing the sample play events of FIG. **14**;

FIG. **16** is a diagram illustrating automatic determination of popular parts of a movie;

FIG. **17** is a flowchart depicting a portion of transcoder operation during movie creation;

FIGS. **18**A-**18**C are charts illustrating ad bounceback;

FIGS. **19**A-**19**C are charts illustrating slip-ad;

FIG. **20** is a chart illustrating ad bounceback and slip-ad;

FIGS. **21-23** are flowcharts illustrating different techniques for using popularity statistics to insert ads in a movie;

FIG. **24** is a diagram illustrating an ad editor interface;

FIG. **25** is a diagram illustrating access permission for a movie;

FIG. **26** is a flowchart depicting transcoder operation to generate a playback product;

FIGS. **27-32** are diagrams used in explaining specialized editing capabilities for making playback products;

FIG. **33** is a diagram illustrating a transcoded movie;

FIG. **34** is a data schema used in the present invention;

FIG. **35** is a diagram of a user interface for playing a movie;

FIG. **36** is a configuration diagram for another embodiment of the present invention;

FIG. **37** is a flowchart showing creation of a deep tag and sending the deep tag to another party;

FIGS. **38**A and **38**B show embodiments of deep tags;

FIG. **39** depicts the process of converting a movie into a texture strip;

FIGS. **40**A-**40**D depict different ways to create a movie-id-print;

FIG. **41** is a diagram of another user interface for playing a movie;

FIG. **42** is a diagram of a pop-up window for creating a deep tag;

FIG. **43** is a diagram of a recipient's screen showing reception of an instant deep tag; and

FIG. **44** is a flowchart showing details of creating and modifying deep tags.

DETAILED DESCRIPTION

As used herein and in the claims, the term "movie" refers to video and/or audio data intended for display to a human. In some cases, the video and audio data are separate but associated data, while in other cases, the video and audio are combined. In still other cases, video exists without audio, and vice-versa. Video encompasses still image data and moving image data.

As used herein and in the claims, the term "editing" includes but is not limited to removing portions of a movie, combining at least two movies to create a new movie, and/or generation of special effects that are composited into a movie. The term "compositing" refers to combining by inserting or overlaying additional content into movie content, for example, adding foreign language subtitles.

As used herein, the term "editor" sometimes means a human who is editing a movie, and sometimes means a computer software program used by the human who is editing a movie to perform the editing.

The disclosures of the following patents are hereby incorporated by reference in their entirety:

U.S. Patent No.	Issue Date	Title
5,880,722	Mar. 9, 1999	Video cursor with zoom in the user interface of a video editor
5,886,692	Mar. 23, 1999	Attracting/repelling edit blocks in a user interface of a video editor
6,027,257	Feb. 22, 2000	Pan and tilt unit
6,157,771	Dec. 5, 2000	Method and apparatus for seeking within audiovisual files
6,181,883	Jan. 30, 2001	Dual purpose camera for VSC with conventional film and digital image capture modules
6,201,925	Mar. 13, 2001	Method and apparatus for editing video files
6,262,777	Jul. 17, 2001	Method and apparatus for synchronizing edited audiovisual files
6,285,361	Sep. 4, 2001	Method and apparatus for clipping video segments from an audio-visual file
6,400,886	Jun. 4, 2002	Method and apparatus for stitching edited video segments
6,661,430	Dec. 9, 2003	Method and apparatus for copying an audiovisual segment

There are several environments in which a user might want to use a movie. Turning to FIG. **1**, an environment including public communication network **100** is shown. Network **100** may be the Internet. Coupled to network **100** are movie system **10**, server **80**, distributed server **82**, proxy ad server **84**, media center **105**, PC **110**, phone **130**, PC **140** and camcorder **145**. Coupling occurs via wireline and/or wireless communication lines, possibly with intermediate computers such as an Internet service provider (not shown).

Movie system **10** includes videobase **20**, database **30**, transcoder **40**, server **50**, DVD burner **60** and internal network **70**. In some embodiments, videobase **20** and database **30** are combined. Elements **20**, **30**, **40**, **50** are general purpose computers programmed according to the present invention, and include suitable processors, memory, storage and communication interfaces; and each element may be embodied in one or many physical units depending on factors such as expected processing volume, redundant hardware design and so on.

Videobase **20** serves to store movies uploaded by users, in their uploaded format, and to store transcoded versions of these movies. Videobase **20** also stores advertisement movies, referred to herein as "ads", intended for inclusion in the transcoded movies.

Database **30** serves to store data for movie system **10**, including data relating to users of movie system **10**, movies processed by movie system **10**, and suitable administrative data such as usage, throughput and audit trail information. In some embodiments, users use movie system **10** for free and the suppliers of ads pay upon ad viewing. In other embodiments, users pay based on usage or a flat rate.

Transcoder **40** serves to receive uploaded movies and process them to generate transcoded movies, as described in detail below with regard to FIG. **10**.

Server **50** receives requests from users via network **100** and responds thereto. In cases where responding to a request requires the services of transcoder **40**, server **50** passes appropriate messages between transcoder **40** and network **100**. Server **50** also functions as a firewall to protect network **70** from improper usage.

Server **50** executes upload manager **55**, a software program that works with uploader **112**, described below, to upload a movie to server **50**.

DVD burner **60** is responsive to commands from transcoder **40** to create a digital video disk, which is then shipped via conventional physical shipping services. In other embodiments, instead of a digital video disk, a read-only or read-write storage medium is created and then the medium is physically delivered to a recipient. Suitable formats include CD (compact digital), DVD (digital video disk), Blu-ray Disc, HD (high definition) DVD, flash drives (transistor memory), jump drives (removable disk drives) and the like.

Billing program **65** examines usage data created by transcoder **40** and server **50**. The usage data is part of the administrative data in database **30**. Billing program **65** then generates invoices and applies authorized payments. For example, some users may have preauthorized charges to their credit cards, telephone bills or bank accounts for their usage of movie system **10**. As another example, transcoded movies created by users may include advertising, for which the advertisers agree to pay based on number of views, and if so, billing system **65** arranges payments to users based on usage of the transcoded movies with advertising.

There is a cost to store and distribute movies. To offset this cost, and to reward users, movie system **10** enables movie creators to include ads, either manually or automatically, in their movies. Movie system **10** enables flexible ad placement, including at the start or end of a movie, within selected frames of a movie, and at a selected location and size within the selected frames. Advertisers generally pay for placement of their ads based on number of times their ad is viewed, and possibly in accordance with the popularity of the place in the movie where the ad is inserted, how much time the ad is inserted for, and the size of the ad relative to a movie frame.

Internal network **70** serves to carry communication traffic between the elements of movie system **10**. Internal network **70** may be a local area network at a single premises, or may span multiple premises.

Server **80** is a general purpose computer coupled to storage **90**. Server **80** responds to requests from communication network **100** by providing movies stored in storage **90**. By providing the address of server **80** to movie system **10**, one of the movies stored in storage **90** can be used as an input for transcoder **40**.

Distributed server **82** is a general purpose computer coupled to storage **92**. Storage **92** holds copies of some or all of the transcoded movies stored in storage **20** of movie system **10**. In some embodiments, there are many instances of server **82** and storage **92**. Distributed server **82** responds to requests from viewers for the transcoded movies stored therein. Use of distributed server **82** reduces response time to requests, reduces the amount of work that movie system **10** needs to do, and reduces bandwidth utilization since usually the instance of server **82** that is closest to the requestor responds thereto. Products and services according to distributed server **82** are available from Kontiki, a Verisign company, and from Akamai.

Proxy ad server **84** is a general purpose computer coupled to storage **94**. Storage **94** stores ads. Operation of proxy ad server **84** is discussed below with regard to FIG. **6**.

Media center **105** generally represents a television that is able to communicate via network **100**. In some embodiments, a viewer provides instructions to media center **105** via a remote keypad, while in other embodiments, a viewer provides instructions to media center **105** using a full keyboard with function keys and so on. In still other embodiments, media center **105** includes a voice recognition unit so that the viewer provides instructions through speech. In some embodiments, such as a home, media center **105** is able to communicate directly with PC **110** and/or phone **130**.

PC **110** is a general purpose personal computer coupled to camcorder **120**. Camcorder **120** enables a user to record a movie and transfer the movie to PC **110**.

PC **110** executes uploader **112** and player **114**. Uploader **112** is a software program that enables a movie to be uploaded from PC **110** to server **50**. Player **114** is a software program that enables PC **110** to view and edit movies, in conjunction with transcoder **40**. When PC **110** registers with server **50**, server **50** downloads uploader **112** and player **114** to PC **110**.

Uploader **112** functions to locate movie files stored in PC **110**, and to manage transmission of the movie files to upload manager **55** of server **50** using a suitable protocol such as the secure file transfer protocol (sftp). In embodiments having a peer-to-peer network for downloading, such as networks using the BitTorrent protocol, the peer-to-peer network is also used for uploading. Since movie files are large, the file uploading may be interrupted; uploader **112** enables the uploading to resume at its interruption point. In some embodiments, uploader **112** converts a very large file, such as a 36 Mb file in DV format, to a smaller file of comparable visual quality, such as a 3 Mb files in MPEG format. Uploader **112** enables the user of PC **110** to select a file for uploading; to monitor the status of the upload, such as percent completed and speed of uploading; to pause and resume the uploading; and to cancel the uploading.

Player **114** is a client application for a PC browser. In some embodiments, player **114** resides on a portable device such as a mobile phone or network-attached digital video camera without a browser, and in these embodiments, player **114** is a network enabled client application.

Player **114** enables a user to view a movie, including forward seek and rewind functions; to seek the compressed video on a remote server using random seek points; to request a movie download from the random seek point, for example, in accordance with U.S. Pat. No. 6,157,771, the disclosure of which is hereby incorporated by reference in its entirety; and to use the functions described below with regard to FIG. **10** on the movie, including creating and editing deep tags (movie segment bookmarks, see FIG. **38**A), creating and editing mash-ups, adding special effects, providing sharing permission to other users, creating virtual and/or physical DVDs, inserting ads, and creating and editing watermarks. FIG. **11**, discussed below, shows a graphical user interface for player **114**.

Phone **130** is a wireless communication device executing versions of uploader **112** and player **114** adapted for the device capabilities of phone **130**. Phone **130** is a coupled to camera **135**, which serves to capture images and provide the captured images to phone **130** as a movie signal. In some embodiments, phone **130** uses the multimedia messaging service (MMS) protocol to transmit and/or receive movies. In other embodiments (not shown), phone **130** communicates with a local network using a protocol such as WiFi, and the WiFi network in turn communicates with communication network **100**.

PC **140** is a general purpose personal computer that is able to view transcoded movies by obtaining an address for the movie, or a segment thereof, and providing the address to server **50**. As an example, a user of PC **110** or a user of phone **130** may upload a movie to movie system **10**, edit the uploaded movie, and provide to the user of PC **140**, via email, an address of an edited segment that the user of PC **140** is permitted to view.

Camcorder **145** is a network enabled movie capture device configured to upload its recordings to movie system **10**. In some embodiments, there is at least one predefined user group able to immediately edit information uploaded from camcorder **145**. This configuration is useful in a security application, for example.

The user of PC **110** or phone **130** serves as an editor. PC **110**, phone **130**, PC **140** and camcorder **145** are each at respective locations that are remote from the location of movie system **10**.

The capabilities of movie system **10** are available via each of the user devices shown in FIG. **1**.

Other embodiments of the present invention wherein the transcoder is local to the movie file are described below. Embodiments in which the movie file is not uploaded via a public communication network are sometimes referred to as a transcoder appliance model.

FIG. **2**A shows PC **141** as executing transcoder **142**. PC **141** typically receives at least one movie to be edited, such as from server **80**, and uses transcoder **142** to edit the movie. In some embodiments, transcoder **142** provides only a subset of the functions provided by transcoder **40**, in accordance with the processing capability of PC **141**. After creating a transcoded movie, PC **141** uploads the transcoded movie to storage **20** in movie system **10**, such as by connecting to communication network **100**.

FIG. **2**B shows a peer-to-peer transcoder network. PCs **143**A, **143**B, **143**C are connected to communication network **100** and respectively execute transcoders **144**A, **1434**B, **144**C. Since movie editing can involve substantial processing, each of transcoders **144**A, **144**B, **144**C is adapted to distribute parts (tasks) of an editing job to others of transcoders **144**A, **144**B, **144**C. Of course, each of transcoders **144**A, **144**B, **144**C is adapted to receive an editing task, to execute the task, typically as part of background processing, and to send the completed task back to the originating transcoder.

FIG. **3** is a flowchart illustrating peer-to-peer transcoding. Let it be assumed that the user of PC **143**B is editing a movie. At some point, the user will command a job that transcoder **144**B recognizes as requiring substantial processing. Examples are applying a special effect to each frame of a movie, applying a special effect to combine one movie with another such as picture-in-picture (PIP), and compositing of ad placement objects such as cars, clothing, beverages etc. into a movie scene, and so on.

At step **200**, transcoder **144**B divides the job into tasks. At step **202**, transcoder **144**B sends one task to transcoder **144**A. At step **206**, transcoder **144**B sends another task to transcoder **144**C. At step **210**, transcoder **144**B receives the completed task from transcoder **144**A. At step **211**, transcoder **144**B receives the completed task from transcoder **144**C. At step **212**, transcoder **144**B assembles the completed tasks into a completed job.

At step **203**, transcoder **144**A receives a task. At step **204**, transcoder **144**A executes its task. At step **205**, transcoder **144**A sends the executed task back to transcoder **144**B.

At step **207**, transcoder **144**C receives a task. At step **208**, transcoder **144**C executes its task. At step **209**, transcoder **144**C sends the executed task back to transcoder **144**B.

Turning to the transcoder appliance model, FIG. **4**A shows PC **150**, camcorder **160** and DVD burner **170**. Camcorder **160** is for recording a movie and providing the recorded movie to PC **150**. PC **150** is a general purpose personal computer operative to receive and store a recorded movie; to enable a user to edit the stored movie using transcoder **155**, which is a software program operative in a similar manner as transcoder **40**; and to provide a transcoded movie to DVD burner **170** for recording thereon, in similar manner as DVD burner **60**.

FIG. **4**B shows video recorder **180**, robotic camera with pan-tilt-zoom (PTZ) control **182**, and DVD burner **183**. Robotic camera **182** is operative to provide a video signal to video recorder **180**. Video recorder **180** is a general purpose computer operative to receive and store the video signal from robotic camera **182**, to enable a user to edit the stored video using transcoder **181**, which is a software program operative in a similar manner as transcoder **40**; and to provide a transcoded movie to DVD burner **183** for recording thereon, in similar manner as DVD burner **60**.

FIG. **4**C shows robotic camera **191**, video recorder **190**, private network **192** and PC **193**. PTZ camera **191** is operative to provide a video signal to video recorder **190**. Video recorder **190** is operative to receive and store the video signal from robotic camera **191**, and to provide the stored video to PC **193** via private network **192**. Private network **192** is a local area network, virtual private network, or the like, which serves to couple video recorder **190** and PC **193**. PC **193** is a general-purpose personal computer operative to receive video from video recorder **190**, sometimes in response to a command from PC **193** and sometimes on a periodic or as-available basis from video recorder **190**; to store the received video; and to execute transcoder **194** to edit the stored video to produce transcoded video. Transcoder **194** is a software program operative in a similar manner as transcoder **40**.

FIG. **5**A is a chart showing static ad **93**A in a mid-roll position in movie **20**A. Movie **20**A comprises frames of video presenting content, such as a comedy movie. During playback, at a particular frame, the comedy movie stops, and the frames of ad **93**A are played back, then the frames of the comedy movie resume playback. Conventionally, ad **93**A is placed at the start of the comedy movie, at the end, or at an intermediate point, as shown in FIG. **5**A.

FIG. **5**B shows static ad **93**B, which is combined with frames of movie **20**B to produce composite video. Static ad **93**B may be placed, e.g., as a banner at the top, and may show a graphic image or an advertising movie, and so on.

FIG. **5**C shows proxy ad **94**A at a mid-point position of movie **20**C. During playback, at the start of the movie, a request is sent to proxy ad server **84**, which replies by sending ad **94**B. At a particular frame, the comedy movie stops, and the frames of ad **94**B are displayed, then the frames of the comedy movie resume. See FIG. **6** below.

FIG. **5**D shows original proxy ad **94**C superimposed on frames of movie **20**D. Original proxy ad **94**C may be placed, e.g., as a banner at the top. During playback of movie **20**D, ad **94**D is requested from proxy ad server **84**, and the frames of ad **94**D are combined with the frames of movie **20**D to produce composite video that is displayed.

FIG. **6** is an event chart illustrating proxy ad delivery. Let it be assumed that the user of PC **140** wants to view a transcoded movie stored in movie system **10**, and that the transcoded movie includes therein a proxy ad, with the ad itself residing in storage **94**.

At step **220**, PC **140** requests the movie from movie system **10**. At step **221**, movie system **10** receives the request, and at step **222** responds thereto by sending the movie including the proxy ad to PC **140**. The proxy ad includes an ad request that PC **140** is expected to send. The ad request typically comprises the network address of proxy ad server **84**, and optional or required parameters to be used by proxy ad server **84** such as movie characteristics and/or viewer characteristics, e.g., keywords relating to the movie,

display characteristics of PC **140**, vertical and horizontal picture resolution of an ad image that can be accommodated in the movie, and so on.

At step **223**, PC **140** receives the movie and ad request. At step **224**, PC **140** sends the ad request and parameters, if any, to proxy ad server **84**. At step **225**, proxy ad server **84** receives the ad request and parameters, if any. At step **226**, proxy ad server **84** selects an ad from storage **94** in accordance with the parameters, and prepares the ad, such as by sizing, in accordance with the parameters. At step **227**, proxy ad server **84** sends the prepared ad to PC **140**.

At step **228**, PC **140** receives the prepared ad, and plays the movie while inserting the received ad at the location indicated by the proxy ad in the movie.

FIGS. **7-8** are flowcharts depicting high-level operation of movie uploading and downloading, respectively.

Turning to FIG. **7**, at step **300**, user1 (not shown) at PC **110** uploads a movie to server **50**, such as a movie recorded by camcorder **120**. The uploaded movie is in an original format, also referred to as a first format or an uploaded format. In some cases, user1 provides an address of server **80**, and instructs server **50** to retrieve the movie from server **80**. Server **50** stores the uploaded movie in videobase **20**. At step **310**, transcoder **40** processes the uploaded movie, enabling the user to edit the uploaded movie as described in detail below, to produce a transcoded movie. The transcoded movie is in a proxy format, also referred to as a second format or an intermediate format.

At step **320**, transcoder **40** stores the transcoded movie in videobase **20**. As described below, user1 can grant permission to other users to view the whole of the transcoded movie, or to view segments of the transcoded movie, by providing suitable addresses to the authorized users.

Turning to FIG. **8**, at step **330**, user2 (not shown), who has received permission to view the transcoded movie, sends a request for the movie to server **50**. The request includes information about the display capability of the device used by user2, such as phone **130** or PC **140**.

At step **340**, server **50** requests the selected movie from videobase **20**, indicating the format for the movie.

At step **350**, if the requested format happens to match the stored format, then the movie is provided directly to server **50**. Otherwise, videobase **20** is operative to convert the format from the stored format to the requested format. The movie is provided in the requested format, also referred to as a third format, a downloaded format, or an output format. Server **50** then sends the provided movie to user2 via suitable distribution method such as streamed video or podcast, or presentation on a web page, blog, wiki, really simple syndication (RSS) or other technique. In some embodiments, videobase **20** sends the stored movie to transcoder **40**, for conversion to the requested format, and then transcoder **40** provides the movie in the requested format to server **50**.

FIG. **9** depicts the overall ad placement process.

At step **2005**, transcoder **40** analyzes the movie characteristics. As used herein and in the claims, inherent movie characteristics means information about the movie itself, without reference to usage or viewing. Examples of inherent movie characteristics include motion, scene changes, face presence, audio track loudness, keywords relating to the movie's subject and so on. In this document, inherent movie characteristics are sometimes referred to as movie characteristics.

At step **2010**, transcoder **40** determines whether the movie has been previously viewed. If not, processing proceeds to step **2020**. If the movie has been previously viewed, then at step **2015**, transcoder **40** analyzes the viewed characteristics of the movie, also referred to herein as the popularity of the movie. Viewed characteristics include number of times that the movie has been requested, number of times that a link or deep tag to the movie has been sent from one viewer to another potential viewer, number of deep tags in the movie, number of times that a particular movie segment was replayed, number of times that viewers paused at a particular movie position, and so on. In some embodiments, the viewed characteristics are associated with the demographics of the viewer, such as gender, age, location, income, interests and so on.

At step **2020**, transcoder **40** determines if the ad placement is occurring in real time. As explained below, movie system **10** can operate in one or more of the following modes:

- by placing one or more ads in a movie, storing the movie plus ads, and then delivering the stored movie plus ads to a viewer in response to the viewer request, referred to as non-real time ad placement mode;
  - As explained below, non-real time ad placement mode has a static version and a variable version. In the static version, the ad is placed once, and remains in its place for the duration of the advertising period, i.e., the timeframe that the advertiser pays for. In the variable version, the ad's position may change from time to time, in accordance with changes in the viewed characteristics of the movie and changes in other advertiser's interest in having their ads included in the movie.
- by receiving a viewer request for a movie, then placing ads in the movie and delivering the movie plus ads to the viewer, referred to as real-time ad placement mode;
- by placing a first set of ads in the movie, storing the movie plus ads, receiving a viewer request, then placing a second set of ads in the movie, and delivering the movie with the first and second sets of ads to the viewer, referred to as real time plus non-real time ad placement mode, or hybrid ad placement mode.

Non-real time ad placement mode enables movie system **10** to operate in essentially a broadcast fashion, for ads. Real-time ad placement mode enables movie system **10** to operate in a narrowcast fashion, wherein the characteristics of the viewer determine what ads are sent to the viewer. If movie system **10** is operating in non-real time ad placement mode, then processing proceeds to step **2030**. If movie system **10** is operating in real-time ad placement mode, or hybrid ad placement mode, then at step **2025**, transcoder **40** analyzes the viewer's characteristics. In this context, characteristics of the viewer includes demographic information as well as activity of the viewer, such as entering a keyword, the material previously viewed by the viewer and so on.

At step **2030**, transcoder **40** retrieves the advertiser's preferences for ad placement. Advertiser preferences can specify movie characteristics, movie popularity characteristics, viewer characteristics, and how much the advertiser is willing to pay depending on the combination of features delivered, which may include whether the ad is viewed or whether the viewer takes an action relating to the ad. For example, some ads include hyperlinks that a viewer can click on, and the advertiser may be willing to pay a first rate if the ad is merely presented to the viewer, and a second rate if the viewer clicks on the hyperlink.

At step **2035**, transcoder **40** determines prices for positioning ads at various places in the movie. The price determination procedure is a function of the movie charac-

teristics, the viewed characteristics, the viewer characteristics, advertiser demand, and the price setting mechanism.

At step **2040**, transcoder **40** places the at least one ad in the movie. It will be appreciated that an advertiser's rules may specify manual placement, in which case transcoder **40** notifies a person associated with the advertiser of the prices for placing the ad at various positions, and a human manually selects ad placement.

In some cases, an ad is composed into the scene, usually manually. For example, the movie scene might be a living room with a television, and the ad is composed to appear to be on the television in the movie scene. As another example, the movie scene may be a wall with a picture frame, and the ad is composed to appear in the picture frame of the movie scene.

At step **2045**, the movie is delivered to the viewer that requested the movie. When movie system **10** operates in non-real time ad placement mode, there is a step (not shown) of storing the movie plus ads in videobase **30** prior to delivering the movie to the requesting viewer.

At step **2050**, statistics are collected about movie viewing, such as by server **50** receiving play trails (discussed below), notices of deep tag transmissions and so on, and storing them in database **30**.

At step **2055**, appropriate viewing reports are generated by billing program **65**, server **50** and transcoder **40**.

A prior art search engine enables advertisers to bid on keywords. During a set-up phase, the advertiser selects the desired keyword(s), and their maximum bid price. In operation, when a searcher enters the desired keyword, advertiser ads are presented in an order corresponding to their bid amounts, that is, the ad with the highest bid is listed first, followed by ads with sequentially lower bid amounts. When the searcher clicks on an ad, the search engine bills the advertiser, that is, if the ad is merely presented with no response from the searcher, the advertiser does not pay. Advertisers can then view reports on the "click-through" activities for their advertisements.

In an embodiment wherein the price of placing an ad in a movie varies, advertisers can determine the price at least in part by bidding. For example, movie system **10** can determine a starting price based for ad placement in portions of a movie based on popularity, level of motion, length of ad, whether the ad is full-motion video or a static image, and so on. Advertisers can then (i) submit specific bids for specific movies, ex: $100 for placement in movie xyz for two weeks, (ii) can define bidding rules, ex: placement in any travel movies viewed at least 100 times per day, ex: placement in any movie segment having a deep tag with the text label "airplane" and where the movie is one of the most popular 1,000 movies for the day, or (iii) can define results and how much they are willing to pay, ex: at least 100 views per hour by girls of age 10-14 located in California at a cost of up to $20 per hour.

The value placed upon media inventory across a timeline of a movie can vary dramatically and dynamically based on continuously updated statistics on both behavioral and contextual analysis of the video stream; for example, the most prized video segments may be those that are most popular and contain the deep tags for "cars", "hotels", "swimming", etc.

FIG. **10** is a flowchart depicting transcoder **40** operation.

As an overview, transcoder **40** receives an uploaded movie, creates a representation for easy editing, and adds user-supplied editing data (steps **400-440**) to create a transcoded movie. Then, at the user's option, some, all or none of the following functions can be performed, in any desired sequence, and in as many editing sessions as desired:

- adding special effects (steps **470-490**),
- including advertising movies in the transcoded movie (steps **500-600**),
- providing permission for other users to view all of the transcoded movie, or segments of the transcoded movie (steps **610-630**), and
- creating a playback product using the transcoded movie, the playback product being one of a mash-up, a tree or a link-up (steps **631-632**).

Including an advertising movie in a transcoded movie ensures that even if the viewer of the transcoded movie has a filter for blocking advertising pop-ups and the like, the included advertising movie is viewed, since the filter considers the advertising movie to be part of requested content.

At step **400** of FIG. **10**, transcoder **40** receives the uploaded video, either from the user or from another web site. The video may be in one of several formats, some of which involve compression using a scheme wherein a compressed frame refers to an earlier and/or later frame, and then provides change information relative to the earlier and/or later frames. Transcoder **40** converts the uploaded movie to a series of self-referential (uncompressed) frames. Generally, a frame is a collection of picture elements (pixels) corresponding to an image presented to a human viewer.

At step **410**, transcoder **40** builds a texture strip representing the movie. Specifically, transcoder **40** applies a function to each frame to generate texture data (see FIG. **39**), and saves the texture data as a video image. For example, the function might be to extract the center 8.times.8 pixels of each frame and realign into a 64 pixel height column and the texture strip is the sequence of 64 pixel columns. The texture strip may be saved as a .jpg file. The texture strip serves to represent the entire movie in a convenient information bar, and is sometimes referred to as a navigation bar. The texture strip is an intuitive way of determining the temporal position of a frame relative to the entirety of a movie. The texture strip often is useful in detecting scene changes, which is important when deciding which frames to group together as a segment.

At step **420**, transcoder **40** creates a source proxy for the uploaded movie. Generally, a source proxy is a representation of the frames of the movie in a particular format that is easy to convert to other formats and to distribute via public communication network **100**. For example, the Flash video format, according to the H.263 standard, can be used for the source proxy.

Using a source proxy reduces the format conversion issue. Specifically, if there are n movie formats, a general transcoder should be able to convert from any input to any output format, which, by brute force, would require n.sup.2 different format converters. However, using a source proxy means that only 2n format converters are needed (n converters to the source proxy format, and another n converters from the source proxy format to the output format). Additionally, as new movie formats become available, supporting them requires creating only 2 converters per format (one to the source proxy format, and one from the source proxy format), rather than 2n with the brute force approach. It is recognized that, sometimes, the source proxy format may be the desired output format.

Editing of the proxy format, also referred to as proxy editing, may occur in several ways.

In one embodiment of proxy editing, the edits are applied directly to the proxy frames.

In another embodiment of proxy editing, the proxy frames are maintained as generated, and an edit list is created, comprising edits to be sequentially applied to the proxy frames. Each time the edited movie is provided, the edits are applied anew to the proxy frames. This embodiment is particularly useful when edits need to be undone, or when many users are editing one movie to create separate edited movies.

In a further embodiment of proxy editing, a hybrid approach is used, wherein during an edit session, an edit list is created, and only at the termination of the edit session are the edits applied directly to the proxy frames.

At step **430**, transcoder **40** generates a thumbnail, also referred to herein as a snapshot, as a visual representation of the entire movie. Typically, the user selects a frame, and transcoder **40** reduces it to a thumbnail size, such as 177.times.144 pixels. A user having many stored movies can conveniently view their thumbnails, rather than or in addition to text descriptions and/or filename descriptions.

At step **440**, transcoder **40** accepts metadata from the user. Movie metadata may include a filename for the transcoded movie, subject matter keywords associated with the movie, a short text description to be associated with the thumbnail, any deep tags the user cares to define, address information such as a hyperlink of information to be associated with the transcoded movie, and an associated movie such as an audio file describing the contents of the movie.

A deep tag is a video bookmark, indicating a sequential group of frames that are to be treated as a separately addressable segment; the deep tag metadata includes the movie filename, the user filename, date of creation of the deep tag, date of most recent modification of the deep tag, a deep tag filename, the start frame, the end frame, the duration of the segment, and a short text description of the segment. A deep tag is understood to be a convenient way of identifying a segment. A deep tag can be thought of as a movie segment bookmark.

FIG. **11** shows screen display **700** of player **114**, provided, for example, at PC **110**, and including video display **710**, thumbnail **715**, texture strip **720**, positioner **730**, deep tag marker **735**, deep tag button **740**, deep tag bar **750**, and function buttons **760**, **771**, **772**, **773**, **775**, **780** and **790**. Screen display **700** is typically used by an editor.

Video display **710** shows the current frame of video. When the editor's device, such as PC **110** or phone **130** permits, the video frame is displayed in its proxy format. However, if the editor's device cannot support the proxy format, the transcoder **40** converts edited frames to an output format suitable for the editor's device prior to sending the edited frames to the editor for display.

Thumbnail **715** is a small image representing the entire movie.

Texture strip **720** comprises sequential frame representations **725** and subsequent information; each frame representation **725** is the result of the function used to create the texture strip, such as a vertical column of 64 pixels, and represents a single frame. Subsequent information indicates special effects applied to the frames and any advertising inserted in the frames. Texture strip **720** is not limited to video transform visualizations, and can be created by any of the following techniques, or other suitable techniques:

- frequency analysis, such as a spectrogram, wherein spectral analysis is performed on an input signal, then the amplitude of the signal at one or more frequencies is plotted against time. A two-dimensional spectrogram plots the amplitude of one frequency versus time; a three-dimensional spectrogram has axes of time, frequency and signal level;
- other video and/or audio signal transforms, such as wavelets; and
- heatmaps (described below).

Positioner **730** indicates where the frame display in video display **710** is located relative to the entirety of the movie. Positioner **730** enables the editor to use texture strip **720** to seek frames in the movie in a random access manner.

Deep tag marker **735** has a left edge that can be adjusted by a user, and also has a right edge that can be adjusted by the user; after the user has adjusted the left and right edges of deep tag marker **735**, the user indicates that these settings should be saved as a deep tag, such as by clicking deep tag button **740**, and providing a text description corresponding to the movie segment indicated by the deep tag. Deep tag marker **735** enables the editor to use texture strip **720** to select a segment of the movie.

Deep tag bar **750** is a visual representation of deep tags that have already been created for the movie. In the example of FIG. **11**, deep tags **751** and **752** have previously been created for the movie, and are located near the start and end, respectively, of the movie being edited.

Function buttons **760**, **771**, **772**, **773**, **775**, **780** and **790** enable the user to edit the movie. Data button **760** enables the user to view and edit metadata associated with the movie. Playback product buttons **771**, **772** and **773** take the user to specialized editing interfaces, discussed below. Effects/scripts button **775** enables the user to add and edit special effects and scripts. Ad button **780** enables the user to include advertising in the movie. Sharing button **790** enables the user to grant permission to other users or user groups to view selected segments of the movie.

Returning to FIG. **10**, at step **470**, transcoder **40** determines whether the user wishes to apply any special effects and/or add scripts to the transcoded movie; a script is executable program code associated with a movie or a position in a movie. An example of a scripting capability is ActionScript2 for the Macromedia Flash player, that makes it possible for Flash movies to be interactive. Other examples of scripting languages are scalable vector graphics (SVG), a language for describing graphics in extensible markup language (XML), and JavaScript. Other suitable scripting languages will be apparent to those of ordinary skill. For example, the user indicates a desire to apply special effects and/or add scripts by selecting effect/script button **775** in FIG. **11**. If so, at step **480**, transcoder **40** provides the user with an effects and scripts editor (discussed below with regard to FIG. **12**). In some embodiments, there are about 300 different effects on the effects menu. The user selects desired effects and/or scripts and indicates where in the movie they should be applied. At step **490**, transcoder **40** applies the effects to the movie and/or associates the scripts with the movie. Generally, the user views the results of the effects, and continues effects editing until satisfied with the result. The user can create multiple versions of a transcoded movie, differing in their special effects and/or scripts.

Examples of special effects include: watermark, mosaic, barndoor, noise, dissolve, spiral, fade in, fade out, increase contrast, decrease contrast, soften perimeter, cut frame, overlay, translucency, wipes, cuts, zooms, and so on.

A movie watermark for a movie including video is one of (a) a permanent graphic such as a logo inserted in each frame of the movie, (b) an overlay graphic such as a logo inserted in each frame of the movie, or (c) hidden information such as a logo, also referred to as steganography. A movie

watermark for an audio only movie is (i) a sound file inserted at a predetermined point in the movie, such as its start or end, or (ii) hidden information such as text, also referred to as steganography.

Examples of scripts include: when the movie is fully loaded, then play a sound file; when the cursor clicks on an area, then create a pop-up window with a particular web page; when the cursor clicks on an object in a video scene, then launch a form—such as for product purchase or survey; and so on.

FIG. **12** shows effects and scripts editor interface **1000**. Effects area **1010** includes library effect button **1020**, custom effect button **1021**, library script button **1022** and custom script button **1023**. Typically, an effect button has an image of the effect and holding the cursor on the button displays text describing the effect, and a script button has an icon on the button and holding the cursor on the button displays text describing the script. Some scripts also include effects, and some effects also include scripts. Forward and reverse navigation buttons **1011**, **1012** enable navigation among the effects and scripts buttons. Clicking describe button **1013** displays text describing the button (same as holding the cursor on the button). Clicking show button **1014** creates a pop-up window showing the effect and/or script in action, useful when the size of the button is too small to fully convey the effect. Effect/script name window **1015** enables the editor to type the name of an effect or to select it from a drop-down menu.

An effect can also include an executable command, as described above with respect to the tree playback product editor.

Texture strip **1030** indicates the frame representations of the movie selected for effects, such as frame representation **1031**. Positioner **1032** enables rapid selection of a frame of the movie. Slider **1035** has a left and right edge that can be adjusted by the editor, to indicate frames to receive an effect. After the editor selects an effect in effects area **1010**, and adjust slider **1035**, the editor clicks apply button **1033** to apply the effect. After the editor has finished applying effects, he or she clicks preview button **896** to preview. If an editor wishes to cancel an effect, she positions slider **1035** on the appropriate frame representations and clicks cancel button **1034**. Publish button **897**, burn button **898**, and back button **899** function as described above.

Returning to FIG. **10**, at step **500**, transcoder **40** obtains the user's preference for including advertising in the transcoded movie. For example, the user indicates a desire to include advertising by selecting advertising button **780** in FIG. **11**. Videobase **20** contains advertising movies, also referred to as ad movies, that is, segments provided by advertisers for inclusion in user-created movies. Database **30** includes the advertiser's preference for the types of movies that the advertiser wants its ad movies to be combined with, whether the advertiser prefers or requires that its ad be used as a static insert or a dynamic insert (discussed below), whether the advertiser permits its ad movies to be used as part of a mash-up video, and how the advertiser pays the user, such as a one-time fee, or per-viewing of the ad movie. Conventional systems place advertising only at the start of user-created content; movie system **10** is more flexible in that advertising can be inserted within a user-created transcoded movie in either a static or a dynamic manner.

If the user wants to include an ad movie in the transcoded movie, at step **510**, transcoder **40** determines whether the user wishes to select the ad movie, or to accept an ad movie selected by movie system **10**. If the user wishes to select the ad movie, at step **520**, transcoder **40** provides the user with a menu of ad movies that are consistent with the characteristics of the user's transcoded movie, and the user selects one or more ad movies for inclusion in their transcoded movie. If the user does not wish to select the ad movies, at step **530**, transcoder **40** selects one or more ad movies based on an ad movie selection procedure and its own determination of how many ad movies are appropriate for the transcoded movie. In some embodiments, the ad movie selection procedure is based on maximizing revenue for the user, and following a least-recently-used ad movie selection procedure. In some embodiments, the determination of how many ad movies are appropriate is based on at least one of: the length of the transcoded movie, keywords in the metadata, how many segments are deep tagged, and the length of the deep tagged segments, and so on.

An ad used with movie system **10** can be static or dynamic. A static ad is inserted in the transcoded movie prior to its storage in videobase **20**. For a dynamic ad, the transcoded movie is stored in videobase **20** with a placeholder, and when the transcoded movie is presented to a user, the actual ad is inserted, the ad being chosen based on a characteristic of the user such as the user's location, referred to as a "geo-aware" ad, the characteristics of the display device, referred to as a "device aware" ad, or other suitable characteristic.

At step **540**, transcoder **40** determines whether the user wishes to control the position of the ad movie(s) within a frame of the transcoded movie, or to accept positioning determined by movie system **10**. If the user wishes to control the positioning of the ad movie, at step **550**, transcoder **40** provides the user with a graphical interface for controlling ad movie positioning, and a menu of how the ad-movie should be inserted, such as a picture-in-picture at the top, left, right or bottom of the transcoded movie, the top being referred to as a "banner" ad, or as a stand-alone segment in the transcoded movie. In some embodiments, transcoder **40** also provides the user with popularity statistics for portions of the movie, discussed in detail below, so that the user can position the ad in accordance with the parts of the movie that viewers like. In some embodiments, the user selects the size of the space in each frame that the ad may occupy. If the user does not wish to control the positioning of the ad movie, at step **560**, transcoder **40** decides where the movie ad should be placed, typically by looking at the default position in the metadata associated with the ad movie.

At step **570**, transcoder **40** determines whether the user wishes to control the frames of the transcoded movie where the ad will be placed, or to accept positioning determined by movie system **10**. If the user wishes to control the positioning of the ad movie, at step **580**, transcoder **40** provides the user with a graphical interface for controlling ad movie positioning, such as a texture strip and slider, and in some cases, popularity statistics (discussed below) for portions of the movie. If the user does not wish to control the positioning of the ad movie, at step **590**, transcoder **40** estimates where the movie ad should be placed. Any suitable estimation procedure may be employed. As an example, if the transcoded movie is a completely new movie with no deep tags, the estimation procedure specifies that the first scene having a length of at least the length of the ad movie is the selected position, and that the ad movie should be inserted as a picture-in-picture in the lower right of the transcoded movie. However, if the transcoded movie is associated with at least one other user, then a popularity procedure is used to select the position for the ad movie.

Collection and processing of user statistics will now be discussed. These statistics are employed in the popularity procedure used to automatically position the ad movie.

FIG. **13** is a flowchart illustrating collection and processing of usage statistics.

At step **1300**, a viewer, such as a user of PC **140**, who is understood to also or alternatively be a listener, requests a movie, such as by clicking on a link to the movie, the link being embedded in an e-mail previously sent to the viewer. At step **1325**, server **50** receives the movie request, and retrieves the requested movie from videobase **20**. At step **1330**, server **50** sends the movie to the requesting viewer, and at step **1335**, server **50** updates its download statistics for the movie.

At step **1305**, the viewer receives the movie, and at step **1310** plays the movie. Playing the movie includes viewing the movie in its intended temporal sequence, pausing, replaying a section of the movie, fast-forwarding, adding one or more deep tags and so on. Meanwhile, at step **1315**, a play trail is being recorded. As used herein and in the claims, a "play trail" means a timestamped sequence of actions that a viewer takes when playing a movie. The timestamp is typically measured in tenths of a second since the start of the movie, but may be measured in clock time or by frame number of the movie, or any other convenient metric. Each action in the sequence carries appropriate information to reconstruct what the viewer did, for example, "pause" indicates how long the movie was paused. When the viewer finishes viewing the movie, at step **1320**, the play trail is sent to server **50**.

FIG. **14** is a timeline illustrating sample play events for a particular viewer. The horizontal access indicates elapsed time in a movie, such as seconds or frames. Events A-E indicate where the viewer replayed portions of the movie. Events F-I indicate where the viewer paused the movie. Events J-K indicate deep tags created by the viewer. A movie play event corresponds to viewer actions that alter the playing sequence of a movie, that is, make the playing sequence be other than a frame by frame display with each frame being displayed for the same time interval.

FIG. **15** is a data structure representing the sample play events of FIG. **14**, that is, FIG. **15** shows play trail **1400**. In general, a play trail has a head indicating the movie ID, the user ID for the viewer, a date stamp for when the play trail was created, such as when server **50** first stored the full play trail. The head also serves as the first statistical unit. Each statistical unit points to the next sequential statistical unit corresponding to the next sequential portion of the movie. Each statistical unit also points to a triplet of event type counters: number of playback events, number of dwell events, and number of deep tags. Each event type counter also points to individual records for the events. Typically, an individual record records the start time of an event and its duration; in the case of a deep tag, text for the deep tag may also be recorded in the individual record. It will be appreciated that, when the play trail data is combined with demographic data associated with the user ID, a rich set of information is available.

In FIG. **15**, head **1410** points to statistical units **1420**, **1430** and **1440**, having event type counters **1411**, **1412**, **1413**; **1421**, **1422**, **1423**; **1431**, **1432**, **1433**; **1441**, **1442**, **1443**, respectively. Event A in FIG. **14** is a playback of the movie from second 2 to second 7, and is represented in FIG. **15** as a (2, 5), where 5 is the duration, i.e., 7 seconds-2 seconds=5. Event A is recorded as a playback event associated with the first statistical unit, seconds 0-5 of the movie, and with the second statistical unit, seconds 5-10 of the movie, since event A spans both statistical units. More specifically, record **1414** and record **1424** both correspond to event A. As another example, event G in FIG. **14** is seen to be a dwell event at second 14 of the movie; the corresponding record **1437** in FIG. **15** indicates a dwell event at second 14 that lasted for 8 seconds.

At step **1340** of FIG. **13**, server **50** receives the play trail. At step **1345**, server **50** stores the play trail along with information about when the play trail was received, and the identity of the viewer, if known, or the computer address from which the play trail was sent. At step **1350**, server **50** updates basic statistics for the movie. Basic statistics include, but are not limited to: number of deep tags created for a portion of a movie, access (listening and/or viewing) frequency for portions of a movie, replay frequency for portions of a movie, pause frequency for portions of a movie, and community score for portions of a movie.

As described above, a play trail is created at the user's location, then sent to server **50**. In other embodiments, the play trail is stored in a so-called cookie, a locally stored data file that tracks an authenticated user's actions on a PC, on the user's PC so that the play trail data can persist over time in the cookie data even when a user's browser session has completed or has closed prematurely. The cookie can be extensive in terms of data structures and may include demographic data as well.

Alternatives to cookies include the use of HTTP authentication, client side persistence, local stored Flash objects, JavaScript window. name variables, and so on; each of these methods provides mechanisms to store and track user play trail data. The advantage of a cookie relative to a local file is that a cookie uses a standardized Internet mechanism to track user data in a well-defined location on a user's hard drive. The data is tracked across user browser sessions and is persistent across those sessions. Cookies protect user privacy by tracking user behavior without tracking identity. FIG. **15** shows how a play trail can be stored as a data structure; however this same approach can be applied to the storage of data in a user cookie stored on a PC. An advantage of a cookie relative to ongoing HTTP message transmission is that the cookie minimizes network bandwidth during network playback if the cookie data is transferred after the session is complete or during periods of minimal activity when interacting with a media application.

Play trails are a form of user behavior tracking. Other user behavior that is tracked to determine popularity of a movie or movie segment includes creating a deep tag and/or sending a deep tag, such as via email, instant message (IM), message service such as SMS or MMS, or podcasting. Deep tags indicate what users consider interesting.

An email or IM version of a deep tag typically comprises a URL providing the address of the deep tag, such as www.server.com/deeptag/movieID/StartTime/EndTime, or www.server.com/movieID/deeptag/deeptag ID. Additionally, the email may include text associated with the deep tag, a thumbnail image for the deep tag, and an attachment comprising the portion of the movie indicated by the deep tag. SMS, MMS and podcast versions of a transmitted deep tag are similar.

Replay frequency measures how many times a listener/viewer replays a particular portion, as opposed to its initial playing.

Pause frequency measures how many seconds that a listener/viewer pauses at a particular point in a movie.

Community score is based on ratings provided by listeners/viewers, explained below in connection with FIG. **35**. The ratings can be summed, or can be normalized. A

normalized score is the total number of star ratings by viewers divided by the total number of viewers. For example, a summed score of 500 might occur because 100 viewers gave a 5-star rating to a movie, or because 500 viewers gave a 1-star rating to a movie; in these examples, the normalized ratings would be 500/100=5, and 500/500=1.

While FIG. **13** shows a situation in which the entire movie is available at PC **140** and server **50** is unaware of how the user is interacting with the movie until server **50** receives the play trail, in other embodiments, server **50** is involved in some user play actions, while PC **140** attends to the remaining user play actions. For example, playback and deep tagging may be accommodated at server **50**, while pause is accommodated at PC **140**. In these other embodiments, server **50** collects portions of the play trail and PC **140** collects the remainder of the play trail, then PC **140** transmits its play trail information to server **50** and server **50** creates a full, combined play trail representing the viewer's actions.

FIG. **16** is a diagram illustrating automatic determination of popular parts of a movie. Horizontal bars **950-955** represent the same movie, as deep tagged by different users. More generally, popularity can be defined as a selected metric or as a weighted combination of metrics. The metric can be one of the basic statistics, or a custom-defined statistic.

Histogram **960**, also referred to as popularity density function **960**, indicates the popularity metric, herein the number of times that a portion of the movie has appeared in a deep tag, which serves as an indication of the popularity of the various parts of the movie, plotted against the sequence in which the frames of the movie are displayed.

Color graph **970** uses different colors to represent different levels of popularity. In one scheme, the most popular portions of a movie are indicated by red areas, while the least popular portions of a movie are indicated by blue areas. In another scheme, different shades of gray are used to indicate popularity.

Color graph **970** can be generated as follows. Let the metric being plotted be the Total Interest in a specific part of the movie. The Total Interest metric is an indicator of the level of popularity of a section of a movie. The Total Interest is a weighted combination of metrics, such as the amount of time paused, the number of playbacks, or the number of deep tags created in a specific section of a movie. First, the metric is normalized to be a value between 0-100. Next, the normalized metric is mapped to the 0-255 code for each of the display colors of blue, green, and red.

As a specific example, let the metric plotted be the number of playback events per unit time for a movie, and assume the maximum number of playback events for any segment of a video is 25, so that 25 playback events is normalized to a value of 100. The color code is calculated using the following formula:

Red=(MAX(((Normalized_Metric−50)*255/50)),0))

Blue=(MAX(((50−Normalized_Metric)*255/50),0))

For: Normalized_Metric<=50: Green=(Normalized_Metric*255/50)

else: Green=((100−Normalized_Metric)*255/50)

Sample usage statistics for a particular movie, and their conversion to RGB values are shown in the following table.

Movie segment	no. playback events	Normalized value	Red	Blue	Green
0 to 5 sec	5	20	0	153	102
5 to 10 sec	10	40	0	51	51
10 to 15 sec	0	0	0	255	0
15 to 20 sec	25	100	255	0	0

The Red Green Blue color values determine the color for a vertical column of pixels in color graph **970** corresponding to the time interval of the movie segment. As is well-known, each pixel of a display is actually a group of three light emitting elements: red, green and blue, and the intensity values for each of the elements determine the color perceived by the viewer. In some embodiments, the columns of color graph **970** are placed next to each other, like bar graphs having the same height, whereas in other embodiments, the colors are interpolated from column to column, to provide a more aesthetically pleasing appearance.

Cloud graph **980** has clouds or circles whose size corresponds to the popularity of a movie portion.

Other types of graphical representations of popularity may be employed, such as three dimensional strips with colored segments, three dimensional bar graphs, surface contour maps in three dimensions, and so on.

As used herein and in the claims, popularity statistics are based on one or more popularity metrics such as total number of requests for a movie, total number of times that the movie has been selected as a favorite (see FIG. **35**), total number of times that the movie has been given a three, four or five star rating (see FIG. **35**), number of times that a portion of the movie has been played back, number of times that a portion of a movie has been paused by a viewer, total pause time for a portion of a movie, number of times that a viewer has placed a deep tag on a portion of the movie, number of deep tag transmissions relating to the movie, and so on.

A further aspect of the movie may be provided by demographic or other selected data about viewers, such as age bracket, gender, location, income level and so on, instead of or in addition to the popularity metrics discussed above. Of course, this can be accomplished only when the viewer provides such demographic data, such as during establishing a new user account.

Popularity graphs can be reported to the owner of the movie.

As shown in FIG. **35**, popularity graphs can be displayed to a viewer of the movie.

Popularity graphs can also be used internally by transcoder **40**. Movie ads are placed in the popular parts, if they are long enough, or with respect to the popular parts, if the popular parts are shorter than the ad movie. For example, the movie ad could be placed so that its start is co-located with the start of a popular segment having a duration of at least 70% of the duration of the ad movie.

Returning to FIG. **13**, generation of a custom statistics report, also referred to as a custom popularity report, will now be discussed.

At step **1380**, an owner of a movie requests custom statistics about the movie. such as a number of deep tags created by a particular demographic group during a particular time period. At step **1355**, server **50** receives the custom statistics request. At step **1360**, server **50** retrieves appropriate play trails, and at step **1365**, server **50** retrieves appropriate user data. At step **1370**, server **50** generates the requested custom statistics report. At step **1375**, server **50**

sends the custom statistics report to the requester. At step **1385**, the requester receives the custom statistics report.

Returning to FIG. **10**, at step **600**, transcoder **40** inserts the selected movie ads into the transcoded movie. Ad insertion is shown in more detail in FIG. **17**. Before turning to FIG. **17**, the diagrams of FIGS. **18**A-**18**C illustrating ad bounceback for static ads, FIGS. **19**A-**19**C illustrating slip-ad for proxy ads, and FIG. **20** illustrating ad bounceback and slip-ad are discussed.

Ad bounceback is a technique for prohibiting skipping of a static ad. The static ad can have a pre-ad zone defined before its start and/or a post-ad zone defined after its end. The pre-ad zone forces a bounceback to a few frames before the start of the ad; this is useful when the context of the movie is helpful to appreciating the ad. The post-ad zone is relevant to certain types of ads, and prohibits a user's skip from beginning until after the end of the post-ad zone

FIG. **18**A is similar to FIG. **5**B that illustrates movie **20**B with static ad **93**B that occupies a portion of the frames of movie **20**B. Segment **355** indicates frames that are played in a conventional manner. Segment **356** indicates that the user has skipped frames, either by fast forwarding or by seeking to a future point in movie **20**B. Segment **357** indicates resumption of conventional frame playback. Segment **356** is seen to skip over ad **93**B.

FIG. **18**B shows ad bounceback in operation for a single static ad. Ad **93**B has pre-ad zone **362** and post-ad zone **363**. Segment **358** indicates frames that are played in a conventional manner. Segment **359** indicates that the user has skipped frames. Segment **360** is a bounceback to the start of pre-ad zone **362**, and segment **361** indicates resumption of conventional frame playback. Segment **361** is seen to play ad **93**B.

FIG. **18**C shows ad bounceback in operation for multiple static ads. Ads **93**E, **93**F, **93**H are static ads occupying respective portions of respective frames of movie **20**E. Ad **93**G is a static ad occupying the entire frames of movie **20**E. Segment **364** indicates frames that are played in a conventional manner. Segment **365** indicates that the user has skipped frames. Since the skip would bypass several ads, namely ads **93**E, **93**F, **93**G, **93**H, there are different strategies that can be employed to determine where the ad bounceback goes to. Only one of these strategies is selected in any embodiment.

One strategy is to bounceback to the earliest ad that would otherwise be skipped. Segment **366** is a bounceback to the start of ad **93**E, and segment **367** indicates resumption of conventional frame playback.

Another strategy is to bounceback to any ads that the user has indicated that he or she wishes to view. For example, prior to viewing a movie, the user may have indicated in preferences provided to movie system **10** that he or she is interested in ads relating to washing machines and/or ads that pay the user to watch them, via an input mechanism such as a user preferences web page. Assume ad **93**F is a washing machine ad. Segment **368** is a bounceback to the start of ad **93**F, and segment **369** indicates resumption of conventional frame playback.

Another strategy is to bounceback to any ads for which the advertiser has required, such as by paying a premium, that the ad be unskippable. For example, the advertiser associated with ad **93**G may have paid to make ad **93**G unskippable. Segment **379** is a bounceback to the start of ad **93**G, and segment **380** indicates resumption of conventional frame playback.

Another strategy is to bounceback to the ad closest to the target skip destination, ad **93**H in this case. Segment **381** is a bounceback to the start of ad **93**H, and segment **382** indicates resumption of conventional frame playback.

Slip-ad is a technique for prohibiting skipping of a proxy ad. Movies can have no-ad zones defined anywhere therein. Slip-ad causes a proxy ad to move its position from the skipped material to after the resumption of playback. In operation, the proxy ad slips to where the user wants to watch.

FIG. **19**A corresponds to FIG. **5**D, showing original proxy ad **94**C that occupies a portion of frames of movie **20**D. Segment **385** indicates frames that are played in a conventional manner. Segment **386** indicates that the user has skipped frames. Segment **387** indicates resumption of conventional frame playback. Segment **386** is seen to skip over ad **94**C.

FIG. **19**B shows slip-ad in operation for a single proxy ad in movie **20**F. No-ad zone **389** occurs at the end of movie **20**F. Segments **385**, **386**, **387** operate as described above. However, original proxy ad **94**C slips to midway between the skip point, that is, the end of segment **386**, and the start of no-ad zone **389**. Segment **388** indicates the slipping of original proxy ad **94**C. The destination of original proxy ad **94**C is referred to as slipped proxy ad **94**C'; the size of the slipped proxy ad can be greater or less than the size of the original proxy ad. Ad **94**D is delivered to the location indicated by slipped proxy ad **94**C', and is part of the movie played to the user.

FIG. **19**C shows slip-ad in operation for multiple proxy ads in movie **20**G. Movie **20**G has original proxy ads **94**C, **94**E and no-ad zone **389**. Segment **388** indicates the slipping of original proxy ad **94**C to slipped proxy ad **94**C'. Ads **94**D, **94**F are respectively delivered to the locations indicated by slipped proxy ads **94**C', **94**E'.

FIG. **20** shows bounceback and slip-ad in operation in the same movie. Movie **20**H has static ad **93**B, original proxy ad **94**C and no-ad zone **389**. Segment **391** indicates frames that are played in a conventional manner. Segment **392** indicates that the user has skipped frames. Segment **386** is seen to skip over static ad **94**B and original proxy ad **94**C. Segment **393** is a bounceback to the start of static ad **94**B. Segment **394** indicates resumption of conventional frame playback. Segment **395** indicates the slipping of original proxy ad **94**C to slipped proxy ad **94**C', located between the end of static ad **93**B and the start of no-ad zone **389**.

FIG. **17** is a flowchart showing details of ad insertion.

At step **602**, transcoder **40** of movie system **10** determines whether a static ad or a proxy ad is being inserted.

If a static ad is being inserted, then at step **603**, the ad is inserted into the appropriate frames of the movie, at the appropriate place within the frames. At step **604**, it is determined whether this ad should be protected by bounceback, such as by querying the editor. If no bounceback is needed, then processing is complete. If bounceback protection is desired, then at step **605**, it is determined whether there should be a pre-ad zone, and if so, at step **606**, how many frames should be in the pre-ad zone. At step **607**, it is determined whether there should be a post-ad zone, and if so, at step **608**, how many frames should be in the post-ad zone. At step **609**, the start of the no-seek zone is defined as the start of the ad minus the pre-ad zone, if any. At step **610**, the end of the no-seek zone is defined as the end of the ad plus the post-ad zone, if any. Ad insertion processing is complete.

If a proxy ad is being inserted, then at step **611**, the proxy ad is inserted into the appropriate frames of the movie, at the appropriate place within the frames. At step **612**, it is determined whether this ad should be protected by slip-ad,

such as by querying the editor. If no slip-ad is needed, then processing is complete. If slip-ad protection is desired, then at step **613**, it is determined whether there should be at least one no-ad zone in the movie, and if so, at step **614**, the frames ineligible to receive a slipped proxy ad are indicated. At step **615**, it is determined whether the size of the slipped proxy ad should be adjusted relative to the size of the original proxy ad. If so, at step **616**, the number of frames in the slipped ad proxy are defined, and an insertion processing is complete. An increased size basically provides a buffer zone relative to any other ads in the movie. A decreased size is meaningful when the proxy ad is a graphic image, and increases the chance that the slipped ad proxy will be small enough to fit into the unskipped part of the movie. If the slipped ad proxy does not require size adjustment, then at step **617**, the size of the slipped ad proxy is set equal to the size of the original ad proxy, and ad insertion processing is complete.

FIGS. **21-23** are flowcharts illustrating different techniques for using popularity statistics to insert ads in a movie. FIG. **21** shows a one-time ad insertion procedure. FIG. **22** shows a periodic ad insertion procedure. FIG. **23** shows a real-time, dynamic, "on the fly" ad insertion procedure.

FIG. **21** shows the technique just described, wherein transcoder **40** inserts ads into a movie. At step **1505**, transcoder **40** obtains the movie, such as because the movie is being edited. At step **1510**, transcoder **40** determines whether the movie has been viewed.

If the movie has been previously viewed, at step **1515**, transcoder **40** obtains movie characteristics and popularity statistics for the movie, such as popularity density graph **960**, color graph **970**, cloud graph **980**, or a computed metric such as Total Interest, discussed above as a weighted sum of various play events. Transcoder **40** also obtains the placement rules for an ad. Typically, an ad provider specifies default placement rules when their account is set up, and can modify, or override for a particular ad or movie, these default placement rules as they wish. Default ad provider placement rules specify whether an ad must be placed manually or automatically, by transcoder **40**. If automatically, the ad provider placement rules are able to further specify whether the ad should be aligned with the start of a popular portion, be centered on a popular portion, be aligned with the end of a popular portion, be placed in the popular portion of closest duration to the ad, or other placement procedure. The duration of the ad and the duration of the movie may or may not be identical. The ad provider placement rules are also able to specify whether the ad provider requires the most popular portion of the movie, or will accept another portion that is still popular, such as by indicating how much of a premium the ad provider is willing to pay. In some embodiments, for aesthetic reasons, transcoder **40** generally ensures that there is only one movie ad in any portion of a movie.

On the other hand, if the movie has never been viewed, which in some embodiments corresponds to the number of views being below a threshold, then transcoder **40** uses a predefined procedure based on movie characteristics to place ads. Instances of a predefined procedure for ad placement include: (i) to place ads so they are uniformly distributed in time throughout the video, (ii) clustering ads into groups between movie portions of two to three minutes duration, permitting four to six ads to be inserted for every eight to ten minutes of movie content, as is done in broadcast television, (iii) to place ads at scene changes in the movie, (iv) to place ads at mid-scene in the movie, and so on. In some embodiments, for aesthetic reasons, transcoder **40** generally ensures that there is only one movie ad in any portion of a movie.

At step **1525**, transcoder **40** places an ad in the movie, with the placement determined either by popularity statistics or the predefined procedure. At step **1530**, transcoder **40** stores the movie with ad(s) in videobase **20**.

FIG. **22** is similar to FIG. **21**, except that in FIG. **22**, a timer constantly runs and at a specified period, such as every hour, every day, every week, or other appropriate period, at step **1535**, transcoder **40** redetermines the position of the ad in the movie.

FIG. **23** shows real-time ad insertion. At step **1570**, a potential viewer requests a movie. At step **1572**, transcoder **40** gets the characteristics of the viewer, if possible. For example, when a user registers with movie system **10**, the user can specify their demographics; if the potential viewer is a registered user, then their demographics are available. At step **1575**, transcoder **40** obtains the movie, and as described above, inserts ads using either popularity statistics or a predefined ad insertion procedure; here, the characteristics of the viewer may also be used to determine what ad(s) to place in the movie. At step **1597**, transcoder **40** sends the movie to the viewer.

Other procedures may be used to automatically insert an ad into a movie, instead of or in combination with the techniques described above.

Motion analysis of a movie may be used to determine where to place an ad, for example, in a scene having the least amount of motion, or alternatively in a scene having a lot of motion but in a relatively static area of the high motion scene. Motion analysis ensures that ad placement is complementary to activity in the movie, rather than obliterating it. For example, some advertisers may specify that their ad should be placed so that it does not interfere or intersect with dramatic scene changes or scenes of high interest with primary characters visible in the scene.

Face analysis of a movie may be used to ensure that an ad is not placed over a face and/or to ensure that an ad is placed in a scene with at least one human face. Advertiser business rules may indicate a preference for ad placement near faces (i.e., just above or below) so that they do not obscure any characters but are assured that their advertisement will be in an important scene.

Image analysis of a movie may be used to ensure that text or logos are not obscured by an ad. Alternatively, it may be desirable to obscure a logo in the movie with an ad.

Examples of products that perform object recognition and face detection on a video stream are:

Autonomy Virage Smart Encode, available at http://www-.virage.com/content/products/vs-smartencode/index-.html, and

Intel Open Source Computer Vision tools, available at http://www.intel.com/research/mrl/research/opencv/

FIG. **24** shows ad editor interface **1100** having ad area **1110**, adpack area **1121** and texture strip **1130**.

Ad area **1110** includes ad thumbnail windows **1111-1120** and navigation buttons **1101**, **1102** for altering which thumbnails of the ad thumbnails in videobase **20** are displayed in area **1110**. Filename entry window **1103** enables a user to type in the name of an ad file, or select an ad filename from a directory, which puts the file's thumbnail in ad thumbnail window **1111**. Ad area **1110** also includes automatic button **1104**, for indicating that movie system **10** should select an ad.

An adpack is a pairing of an ad movie and an adpack description. An adpack description controls how the ad movie will be displayed in the transcoded movie. Examples of adpack descriptions are:

Ad image at frame bottom

Ad image at frame bottom, fade in and fade out

Ad image slides from left to right in succeeding frames

Ad audio plays when frames are viewed

Ad video at frame top

Ad video at frame bottom

Ad video in frame left

Ad video in frame right

The International Advertising Bureau has defined standard ad display areas, and these may be used as adpack descriptions; see, for example, http://www.iab.net/standards/popup/index.asp.

An adpack can also include one or more executable commands, as described above with respect to the tree playback product editor. The provider of an ad movie typically specifies certain adpacks as selectable for its ad movie, and configures the commands to be associated with its ad, movie. Examples of commands are: (i) a hyperlink to the ad provider's web site, (ii) sending the email address of the viewer of the transcoded movie to the ad provider, and (iii) requesting a file download from the ad provider to the viewer of the transcoded movie; other commands are also contemplated.

If the ad is a proxy ad, the adpack includes the address of the proxy ad server where the ad resides.

An adpack can also include special effects and scripts. For example, an adpack may be comprised of a special effect to fade in a graphical banner, then to fade out the graphical banner, wherein the graphical banner is overlaid in a video stream that permits the user to execute a script when clicking on the banner ad, the script causing the user's browser to launch a web site for an advertiser with analytics and tracking for the user interactions.

Adpack area **1121** includes adpack description windows **1125-1128** and navigation buttons **1122**, **1123** for altering which adpack descriptions are displayed in area **1121**. Filename entry window **1124** enables a user to type in the name of an adpack, or select an adpack from a directory, which puts the adpack in adpack description window **1125**. Adpack area **1121** includes script parameters button **1129**, for enabling a user to enter parameters for a script. Adpack area **1121** also includes automatic button **1105**, for indicating that movie system **10** should select the placement of the ad in the frame.

Texture strip **1130** includes frame representations of the movie being edited, such as frame representation **1131**. Positioner **1132** enables rapid selection of a frame of the movie. Slider **1135** indicates frame representations in the texture strip; the editor can adjust the left and right edges of slider **1135**. Automatic button **1106** is used when the editor wishes to indicate that movie system **10** should select the frames in which the ad is placed.

To manually insert an ad, the editor selects an ad, such as by clicking ad thumbnail **1117**, then selects an adpack description to control where in the frame the ad is placed, such as by clicking adpack description **1127**, then adjusts slider **1135** to indicate which frames the ad is placed in, then clicks insert button **1133**.

To instruct movie system **10** to select an ad and put it in the movie being edited, the editor clicks automatic buttons **1104**, **1105** and **1106**.

Rules button **1107** enables the editor to specify the advertiser's ad placement preferences. Advertiser preferences can specify movie characteristics, movie popularity characteristics, viewer characteristics, and how much the advertiser is willing to pay depending on the combination of features delivered, which may include whether the ad is viewed or whether the viewer takes an action relating to the ad. For example, some ads include hyperlinks that a viewer can click on, and the advertiser may be willing to pay a first rate if the ad is merely presented to the viewer, and a second rate if the viewer clicks on the hyperlink. Clicking rules button **1107** makes another window (not shown) appear, that guides the editor through specifying the advertiser preferences. In some embodiments, when an advertiser first registers with movie system **10**, the advertiser specifies their default preferences; in these embodiments, the window (not shown) has the defaults filled in, and enables the editor to override the defaults.

To remove an ad, the editor adjusts slider **1135** then clicks cut button **1134**.

Buttons **896**, **897**, **898**, **899** function as follows.

Preview button **896** being actuated causes transcoder **40** creates preview window **802**, shown in FIG. **28**, having viewing area **803**, and navigation button **804-807**, and begins playing the mash-up in preview window **803**. The user clicks back button **804** to "rewind" the playback, forward button **805** to "advance" the playback, pause button **806** to pause the playback, and stop button **807** to terminate the playback and close preview window **802**.

Publish button **897** being actuated causes transcoder **40** to pop-up a window (not shown) that enables the user to select a thumbnail and destination.

Burn button **898** enables the user to indicate to transcoder **40** that burning (recording) onto a medium is desired. Clicking burn button **898** causes transcoder **40** to pop-up a window (not shown) that enables the user to select a media for burning and provide delivery directions for the burned media.

Back button **899** enables the user to return to edit window **700** in FIG. **11**.

Returning to FIG. **10**, at step **620**, transcoder **40** determines whether the user wishes to share the transcoded movie, or segments thereof. For example, the user indicates a desire to share by selecting share button **790** in FIG. **11**. If so, at step **625**, the user identifies segments by deep tagging them, or using previously defined deep tags. At step **630**, the user identifies who is permitted to access which segments. In some embodiments, when a user registers with movie system **10**, the user can create access groups having one or more outside users in each group; the same outside user can be included in one or more access groups. An outside user is generally identified by a nickname and an email address. Then, the user instructs transcoder **40** when to make the access permissions effective, typically by sending an email to the outside users identifying the segment address, and its short text description. The segment address is of the form: (server **50** address, transcoded movie identifier, deep tag identifier). In some embodiments, the user can, as part of sharing, list the transcoded movie in a directory accessible to other users of movie system **10**, searchable by characteristics of the transcoded movie, such as its metadata subject keywords, its creation time, and/or its ads.

FIG. **25** is a diagram illustrating access permission for a movie. Let it be assumed that the owner of movie **900**, user1, defines a deep tag indicating segment **904** of movie **900**, and permits an outside user, user2, to access segment **904**. Now, in movie **900**, segments **902** and **906** are private segments, while segment **904** is a shared segment.

User2 sees segment **904** as movie **910**. User2 can define a deep tag indicating segment **914** of movie **910**, and permit an outside user, user3, to access segment **914**. Now, in movie **910**, segments **912** and **916** are private to user2, while segment **914** is shared.

User3 sees segment **914** as movie **920**, and can similarly enable access to all or parts of movie **920**.

At step **631** of FIG. **10**, transcoder **40** determines whether the user wishes to create a playback product. If so, at step **632** of FIG. **10**, the steps of FIG. **26** are executed by transcoder **40**.

If the movie that is to be turned into a playback product includes one or more static ads, then the playback product includes those ads and viewers of the playback product see the static ads. If the movie includes one or more dynamic ads, then the playback product includes those dynamic ads; if the player of the playback product is suitably coupled to a communication network and can interpret the embedded information to dynamically retrieve ads, then the viewer of the playback product will see the dynamic ads, otherwise, the viewer of the playback product will not see the dynamic ads.

Turning to FIG. **26**, at step **650**, transcoder **40** receives the user's selection of which playback product is to be created. For instance, using the editing interface of FIG. **11**, the user indicates which playback product by selecting one of buttons **771**, **772**, **773**. In this embodiment, three products are defined. In other embodiments, other products are available. The playback products are a mash-up, a tree, and a link-up.

A mash-up is a sequential display of selected segments. A viewer of a mash-up playback product can only navigate forward or backward in the product.

A tree is a set of segments and a hierarchical, linear control structure for displaying the segments. Generally, a viewer of a tree playback product clicks on selections to navigate the product, in addition to forward and backward.

A link-up is a set of segments and a non-linear control structure for displaying the segments. Generally, a viewer of a link-up playback product navigates via one or more of: forward and back movement, clicking on selections, and/or providing alphanumeric input. A tree and a mash-up are constrained forms of a link-up.

If a mash-up is selected, at step **655**, the user selects the sequence of segments to be included via a mash-up editor. Then, at step **685**, the user selects whether the mash-up is to be published or burned.

Publishing means transferring the mash-up to videobase **20** or to user PC **110**. If publishing is selected, at step **690**, the user selects a thumbnail to represent the mash-up, and provides metadata if desired such as a mash-up filename. At step **695**, the user indicates a destination for the mash-up file, such as videobase **20**, or PC **110**. Transcoder **40** responds by transferring the mash-up in accordance with the user's selections.

Burning means writing the mash-up to a removable storage medium, such as a DVD or memory chip, and sending the removable storage medium to the user. If burning is selected, at step **698**, transcoder **40** transfers the mash-up file to the removable storage medium type designated by the user. In the case of a DVD, transcoder **40** sends the mash-up file to DVD burner **60**, which creates a DVD having the mash-up.

FIG. **27** shows mash-up editor interface **801**. Thumbnail area **810** includes navigation buttons **825**, **826** for altering which thumbnails of the user's stored thumbnails are displayed in area **810**. In general, a user acquires stored files, represented by thumbnails, by uploading a movie, image, graphic or audio file; selecting frames of an existing movie; or creating a playback product as described herein. After storing a file, the user can edit the file by selecting the file's thumbnail in one of the specialized editors discussed herein. Thumbnail area **810** shows ten thumbnail windows **811**-**820**, but a user may have hundreds of stored files, each with a corresponding thumbnail. Filename entry window **827** enables a user to type in the name of a file, or select a filename from a directory, which puts the file's thumbnail in thumbnail window **811**.

Slots area **836** comprises placeholders into which the editor, also referred to as the user, drags and drops thumbnails to indicate that the thumbnails are part of the mash-up being created. Slots area **836** includes slots **837**, **838**, **839**, **840**.

Texture strip **830** represents the mash-up being created. Phantom start and end frames **831**, **832** enable the user to add thumbnails before or after the selected thumbnails. Frame selector **835** has start and end portions that can be adjusted by the user. After the user is satisfied with the thumbnails dragged into slots **837**-**840**, the user clicks insert button **833** to insert these thumbnails into the mash-up. In response, transcoder **40** creates a frame representation of each thumbnail, puts the thumbnail frame representation in the appropriate frame of texture strip **830**, and clears slots **837**-**840**. To insert subsequent files into the mash-up, the user moves frame selector **835** to a position after the inserted thumbnails. To insert preceding files into the mash-up, the user moves frame selector **835** to include phantom frame **831**. To delete files from the mash-up, the user positions frame selector **835** on the frame representations of the thumbnails of the files to be deleted, and clicks cut button **834**.

At any time, the user can click preview button **896** to see what the mash-up will look like. In response to preview button **896**, transcoder **40** creates preview window **802**, shown in FIG. **28**, having viewing area **803**, and navigation button **804**-**807**, and begins playing the mash-up in preview window **803**. The user clicks back button **804** to "rewind" the playback, forward button **805** to "advance" the playback, pause button **806** to pause the playback, and stop button **807** to terminate the playback and close preview window **802**.

Publish button **897** enables the user to indicate to transcoder **40** that publication of the mash-up is desired. Clicking publish button **897** causes transcoder **40** to pop-up a window (not shown) that enables the user to select a thumbnail and destination.

Burn button **898** enables the user to indicate to transcoder **40** that burning of the mash-up is desired. Clicking burn button **898** causes transcoder **40** to pop-up a window (not shown) that enables the user to select a media for burning and provide delivery directions for the burned media.

Back button **899** enables the user to return to edit window **700** in FIG. **11**.

If a tree playback product is selected, at step **660**, the user selects the sequence of segments to be included via a tree editor, and at step **665**, defines the tree structure. Then, at step **685**, the user selects whether the tree playback product is to be published or burned.

FIG. **29** shows tree editor interface **851**. Tree editor interface **851** is generally similar to mash-up editor interface **801**; similarities will not be discussed for brevity.

Tree structure window **855** shows a graph of the control structure of the tree playback product being created. Initially, the window is blank, since nothing has been specified.

FIG. **30** shows an example of tree structure window **855** after a tree playback product has been created. The tree

playback product includes segments **855-1**, **855-2**, **855-3** and **855-4**. Window **855** shows, via lines, the control structure for the navigation between the segments of the playback product. In this example, segment **855-1** leads to segment **855-2** which in turn leads to either of segment **855-3** and **855-4**.

Each segment of a tree playback product comprises a background, a foreground and a link. In one embodiment, a background is a still image, a foreground is a video or audio segment, and the link is indicated by a graphic image. When the viewer of the playback product clicks on the link, the viewer is taken to the next segment, that is, a link indicates one segment. Each segment can have 0, 1 or multiple links.

A tree segment can also include 0, 1 or multiple commands. Typically, a command is indicated by a graphic image. When the viewer of the playback product clicks on the command, the command is sent to the source of the playback product, such as server **50**, for execution.

Returning to FIG. **29**, to create a segment, the editor drags and drops thumbnails from thumbnail window **810** into at least one of background slot **861**, foreground slot **862**, and link slot **863**. If more links are desired for this segment, the editor clicks add link button **864**, and then drags and drops thumbnails into the additional link slots (not shown) created by clicking link button **864**. When the user is satisfied, he or she clicks insert button **867** to create a segment.

If a tree playback product segment is created with at least one link, transcoder **40** creates an empty segment as the destination of each link, and displays the empty segment in tree structure window **855**. The editor clicks on the empty segment in tree structure window **855** and inserts thumbnails into at least one of the background, foreground and link slots.

If the editor wishes to delete a segment, the editor selects the segment in tree structure window **855**, then clicks cut button **856** to remove the segment. Removing a segment automatically removes the link leading to the segment from the preceding segment.

To create a command in a segment, the editor clicks add command button **865**. Transcoder **40** provides a pop-up window with a command editor (not shown) that enables the editor to drag and drop a thumbnail indicating the command, select a command from a menu of commands or type the command directly into a command line window (if the editor knows how to write commands in the command language, such as JavaScript), and, when appropriate, provide parameters for the command. Examples of commands are: (i) a hyperlink to a webpage, (ii) provide the email address of the viewer of the playback product to the owner of the playback product, (iii) provide the email address of the viewer to a third party, (iv) download a program and execute it, and so on.

It will be understood that a thumbnail can be dropped into multiple slots during creation of a tree playback product.

Clicking preview button **896** causes transcoder **40** to create a window similar to that shown in FIG. **28**, however, the tree playback product includes link areas in window **803** that a user can click to navigate between segments.

If a link-up playback product is selected, at step **670**, the user selects the sequence of segments to be included via a link-up editor. At step **675**, the user defines the link-up structure. At step **680**, the user defines the link-up navigation questions and answers. Then, at step **685**, the user selects whether the link-up is to be published or burned.

FIG. **31** shows link-up editor interface **871**. Link-up editor interface **871** is generally similar to tree editor interface **851**; similarities will not be discussed for brevity.

Link-up structure window **875** shows a graph of the control structure of the link-up playback product being created. Initially, the window is blank, since nothing has been specified.

FIG. **32** shows an example of link-up structure window **875** after a link-up playback product has been created. The link-up playback product includes segments **875***a*, **875***b*, **875***c* and **875***d*. Window **875** shows, via lines, the control structure for the navigation between the segments of the playback product. In this example, segment **875***a*, always the first segment to be played during playback, leads to segments **875***b*, **875***c* and **875***d*. Segment **875***b* leads to **875***a* and **875***c*. Segment **875***c* leads to segments **875***b* and **875***d*. Segment **875***d* is sometimes referred to as a final segment, since it is never followed by another segment. Segments **875***b* and **875***c* are sometimes referred to as intermediate segments, since they are not the start segment and they do lead to another segment.

Returning to FIG. **31**, to create the link-up structure, the editor drags and drops thumbnails from thumbnail window **810** into start slot **880** and at least one of intermediate slots **881**, **882**, **883**. If more links are desired for this segment, the editor clicks add link button **878**, and then drags and drops thumbnails into the additional slots created by clicking link button **878** (not shown). When the user is satisfied, he or she clicks insert button **877** to create the link-up. Transcoder **40** responds by displaying the link-up in link-up structure window **875**, highlights the just-created bit of link-up structure, and freezes the highlight until the editor clicks edit Q&A button **879** to create text associated with the link-up.

A Q&A dialog (not shown), consists of an optional header and a set of choices associated with the respective links. One instance of a Q&A is,

Click on the word to indicate what you want to view next:
- kitchen
- den
- basement
- garage
- backyard

Another instance of a Q&A is,

More pictures of actor Alice
More pictures of actor Bob
More pictures of actor Chris

Another instance of a Q&A is,

Type (or click on) the number closest to your age:
- 15
- 20
- 25
- 30

If the editor wishes to delete a segment, the editor selects the segment in link-up structure window **875**, then clicks cut button **876** to remove the segment. Removing a segment automatically removes the portion of the Q&A leading to the segment from the preceding segments.

Clicking preview button **896** causes transcoder **40** to create a window similar to that shown in FIG. **28**, however, the link-up playback product includes Q&A areas in window **803** that a viewer can utilize to navigate between segments.

The transcoded movie is then stored in videobase **20**, and database **30** is suitably updated.

A use case will now be discussed.

Let it be assumed that a user uploads three files (FIG. **10**, step **400**). The first file is a DVD file in MPEG2 format. The second file is a webcam file in MPEG4 format. The third file is a mobile phone camera recording in 3GP format. At this time, the MPEG2, MPEG4 and 3GP formats are considered incompatible.

Movie system **10** converts each of these three files to proxy files in H.263 Flash format (FIG. **10**, step **420**). Let it be assumed that each of the proxy files has 100 frames, and have the filenames:

Proxy-1200
Proxy-1201
Proxy-1202

Now the user creates a mash-up (FIG. **10**, step **450**) using the mash-up editor (FIG. **27**). Transcoder **40** represents the mash-up as a list of the proxy files and the start and end frames of each proxy file:

Proxy-1200, start 22, end 27
Proxy-1201, start 84, end 86
Proxy-1202, start 62, end 70

Next, the user adds special effects (FIG. **10**, step **480**) using the effects editor (FIG. **12**). Let it be assumed that one special effect is a watermark (effect 45) comprising an image in the user's file proxy-678, and another special effect is a dissolve (effect 18) between the seventh to ninth frames of the mash-up. Transcoder **40** represents the result as:

Proxy-1200, start 22, end 27
Proxy-1201, start 84, end 86
Proxy-1202, start 62, end 70
Effect 45, proxy-678
Effect 18, start 7, end 9

Finally, the user inserts two ads, allowing the system to automatically choose the ads and their placement (FIG. **10**, steps **530**, **560**, **590**) using the ad editor (FIG. **24**). Transcoder **40** represents the result as:

Proxy-1200, start 22, end 27
Proxy-1201, start 84, end 86
Proxy-1202, start 62, end 70
Effect 45, proxy-678
Effect 18, start 7, end 9
Ad 4511268, adpack 2, start 3, end 6
Ad 3897522, adpack 163, start 11, end 16

FIG. **33** shows the texture strip resulting from this use case. Texture strip **1200** comprises frame representations **1201-1218**. As indicated by bracket **1271**, frame representations **1201-1207** are from file Proxy-1200. As indicated by bracket **1272**, frame representations **1208-1210** are from file Proxy-1201, As indicated by bracket **1272**, frame representations **1211-1218** are from file Proxy-1202. Watermark **1230**, the logo in file proxy-678, is present in the bottom right of each frame, as depicted in each of the frame representations. Dissolve special effect **1260** is present in frame representations **1207-1209**. First ad **1240**, having frame representations **1241-1244**, in present as a top banner in frames **1203-1206**. Second ad **150**, having frame representations **1251-1256**, is present as a side banner in frames **1211-1216**.

It will be appreciated that some editing functions can be accomplished in several ways. For example, if the user wishes to delete a frame from the movie, this can be accomplished via (1) creating a mash-up comprising the frames before the deleted frame, followed by the frames after the deleted frame, and not including the deleted frame; (2) adding a special effect to cause the deleted frame to be entirely dark or entirely light, as part of a scene transition; (3) directly selecting "delete frame" from the special effects menu; (4) enabling sharing of the entirety of the movie except for the to-be-deleted frame; and so on.

FIG. **34** is a partial data schema for database **30**. Generally, database **30** can be viewed by users or by movies having appropriate access permission. The schema is structured in accordance with usage of movie system **10**.

FIG. **35** shows screen display **1390**, provided, for example, at PC **140** or phone **130**, and including video display **1391**, texture strip **720**, positioner **730**, deep tag marker **735**, deep tag thumbnails **738**A-**738**C, deep tag button **740**, navigation buttons **804-807**, send button **1392**, favorites button **1393**, popularity selector **1395**, rating selector **1396** and graph area **1394**. Screen display **1390** is typically used by a listener/viewer of a movie.

Elements **720**, **730**, **740** and **804-807** function as described above; the description will not be repeated here for brevity.

Deep tag thumbnails **738**A, **738**B, **738**C appear in a deep tag windowpane. Each of the deep tags associated with the movie being displayed has an associated thumbnail. Each thumbnail is a small image and associated text including deep tag creator name, creation date and time, and any keywords provided by the creator. The small image is configured by the deep tag creator, and can be a portion of an image in a scene, a shrunken image of the scene, an image of the creator, or other suitable visual cue. The deep tag windowpane enables the viewer to scroll among the deep tag thumbnails for the movie. Typically, the thumbnails appear in sequential order corresponding to their location in the movie, but other orders can be used, such as popularity order.

Send button **1392** is used to email a hyperlink of the movie to an email account. Clicking on send button **1392** causes a window to pop-up for entry of an email address, similar to the pop-up window shown in FIG. **42**. The pop-up window may have a drop down menu of previously used email addresses arranged by frequency of use, or alphabetical order and so on. In some embodiments, the window enables provision of a text message accompanying the hyperlink.

Favorites button **1393** is used to add the movie to the viewer's list of favorite movies maintained by the player for the user.

Popularity selector **1395** enables the user to control display of a popularity graph, as explained above with regard to FIG. **13**. Popularity selector **1395** comprises a set of so-called radio buttons, from which one button can be selected. Selecting "None" suppresses display of a popularity graph. In FIG. **35**, "Color graph" is selected, and so color graph **970** of FIG. **13**, as appropriate for the movie being viewed, is provided in graph area **1394**. In other embodiments, popularity selector **1395** uses a different format, such as a drop-down menu instead of radio buttons.

Rating selector **1396** enables the user to rate the movie. Rating selector **1396** comprises a set of so-called radio buttons, from which one button can be selected. The default is "unrated". If a viewer wishes to rate the movie, she or he clicks on the appropriate number of stars, from one star to five stars. In other embodiments, rating selector **1396** uses a different format, such as a slider bar instead of radio buttons.

FIG. **36** is a configuration diagram for another embodiment of the present invention depicting the entities involved in deep tag usage. FIG. **36** shows movie system **10** as including server **50**, network **70**, known content owner movie-id-prints database **31**, known content owner deep tags database **32**, unknown content owner movie-id-prints database **33**, and unknown content owner deep tags database **34**. FIG. **36** also shows server **80**, movie storage **90**, communication network **100**, PC **140**, phone **131**, and registered content owner host **141**.

Server **80** serves to provide a website to visitors that access the website using network **100**. Typically, server **80** provides software from movie system **10** that enables dis-

play of movies stored in movie storage **90** using the screen interface shown in FIG. **41**. In some cases, the provided software operates to send a so-called browser plug-in program to a browser used by a visitor to the website provided by server **80**.

Phone **131** is able to communicate wirelessly with communication network **100**, and to play movies, receive email and so on.

PC **140** is a general purpose computer executing software in accordance with the present invention. In one embodiment, PC **140** has a web browser that is capable of interacting with information received from server **50** or **80**.

Registered content owner host **141** is a general purpose computer programmed to receive and send messages using communication network **100**, and may be a personal computer or a web server coupled to other computers.

It will be recalled that a deep tag can be thought of as a movie segment bookmark.

A movie-id-print is like a fingerprint for a movie, that is, a short way to identify a movie.

It is recognized that the ability to deep tag movies, and to send the deep tags to others opens the door to copyright concerns. The configuration shown in FIG. **36** addresses this problem by enabling movie content owners to specify rules for deep tag creation, and further tries to address copyright concerns by tracking deep tagging of movies having unknown content owners, notifying registered content owners of deep tagging of a movie that has an unknown content owner, and, after ownership is established, ensuring all deep tags comply with the content owner's rules. These features are discussed in detail below.

FIG. **37** is a flowchart showing creation of a deep tag and sending the deep tag to another party.

At step **2070**, the user of PC **140** views a movie, either from movie storage **20** that is part of movie system **10** (see FIG. **1**), or from movie storage **90**. At step **2072**, the user indicates that he or she wishes to deep tag a portion of the movie, such as by clicking on deep tag button **740** or fast deep tag button **741** (see FIG. **41**, below). See the discussion below of different ways that a fast deep tag button can indicate what frames should be deep tagged. At step **2074**, the user optionally provides text to accompany the deep tag. At step **2076**, the user optionally sets access permission for the deep tag. At step **2078**, the user specifies the email address, or so-called instant message id, of one or more recipients of the deep tag. At step **2080**, the user sends the deep tag to the named recipient, such as the user of phone **131**.

At step **2082**, the user of phone **131** receives the deep tag, such as in the form of a hyperlink in an email, an icon in an instant messaging system, or other suitable method. At step **2084**, the user of phone **131** activates the deep tag, which causes a movie player to begin executing on phone **131** and to play the movie segment indicated by the deep tag.

FIGS. **38**A and **38**B show embodiments of deep tags. FIG. **38**A corresponds to the deep tag information shown in FIG. **34**, namely:

- deep tag ID
- movie ID (for the movie the deep tag is associated with)
- user ID (the creator of the deep tag)
- deep tag start time relative to the movie
- deep tag end time relative to the movie
- a deep tag text description provided by the user
- number of deep tag snapshots (thumbnails) associated with the deep tag
- pointers to the deep tag snapshots

It will be recalled that a snapshot, also referred to as a thumbnail, is a frame chosen to represent the object, for example, a frame at the start, middle or end of the deep tag.

FIG. **38**B includes the information of FIG. **38**A plus the following: movie-id-print, for convenience in converting from an unknown content owner to a known content owner, the creation date and time of the deep tag, and for each time the deep tag is sent: the sender address, the recipient address, the date and time that the recipient first viewed the deep tagged information, and a text comment, if any, provided by the recipient; an address can be an email address, an instant message ID, and IP address or any other suitable identifier.

Deep tags for which the content owner is known are stored in known content owner deep tags database **32**. Deep tags for which the content owner is unknown are stored in unknown content owner deep tags database **34**.

FIG. **39** depicts the process of converting movie **20**J into texture strip **720**. As explained above, transcoder **40** builds the texture strip representing the movie by applying a function, shown as "f(.)" in FIG. **39**, to each frame to generate texture data. Transcoder **40** is typically built so that the function is a module, sometimes selected from a library of modules. Texture strip **720** may represent each frame of movie **20**J, or may represent selected frames of movie **20**J, with the selection being periodic, random, or according to another predetermined procedure. For example, the function might be to extract the center 8.times.8 pixels of each frame and realign into a 64 pixel height column and the texture strip is the sequence of 64 pixel columns. In some embodiments, transcoder **40** checks whether the center set of 8.times.8 pixels are substantially unchanged from frame to frame, and if so, selects different pixels from each frame such as sweeping the position of the 8.times.8 pixel set along a diagonal, from frame to frame, or other suitable technique.

FIGS. **40**A-**40**D depict different ways to create a movie-id-print. Generally, a function g(.) is applied to something to generate the movie-id-print. In the technique of FIG. **40**A, the function g1(.) is the identity function, so that texture strip **720** is the same as movie-id-print **2200**. In the technique of FIG. **40**B, the function g2(.) is a subset selector, so a portion of texture strip **720** is used as movie-id-print **2210**. FIG. **40**B is a more detailed view of texture strip **720**, corresponding to when texture strip **720** comprises columns of pixels. In the technique of FIG. **40**C, the function g3(.) is a hash function and is applied to texture strip **720** to create movie-id-print **2220**. In the technique of FIG. **40**D, the function g4(.) is a hash function and is applied to movie **20**J to create movie-id-print **2230**.

Movie-id-prints for which the content owner is known are stored in known content owner movie-id-prints database **31**. Movie-id-prints for which the content owner is unknown are stored in unknown content owner movie-id-prints database **33**.

FIG. **41** is a diagram of a user interface for playing a movie, and is similar to the diagram of FIG. **35**. Corresponding elements will not be described for brevity. It will be recalled that the typical way to create a deep tag is by adjusting the left and right sides of deep tag marker **735**, such as by dragging, then clicking deep tag button **740**. If desired the thus-created deep tag can be sent to another party using send button **1392**. If no deep tag has been indicated, send button **1392** will select the address of the entire movie being viewed for transmission to another party.

Deep tag imprint **2320** is superimposed on texture strip **720**, and indicates frames that have a deep tag associated therewith. There may be many instances of deep tag imprint **2320** for each texture strip **720**, each instance corresponding

to a separate deep tag, the deep tag being stored in known content owner deep tag database **32** or unknown content owner deep tag database **34**.

Deep tag descriptor **2330** is associated with deep tag imprint **2320**, and provides the text descriptor, if any, that is part of the deep tag. For example, if a cursor is positioned on deep tag descriptor **2330**, a small area opens on screen **2300** and displays the text descriptor. Alternately, a pop-up window displays the text descriptor.

Deep tag thumbnail **2335** is similar to deep tag thumbnail **738**A of FIG. **35**, except that deep tag thumbnail **2335** is superimposed on the movie displayed in viewing area **2310** when the movie frames indicated by the deep tag are displayed. In practice, deep tag thumbnail **2335** may be provided as a composite overlay that is translucent, so that the movie frame of viewing are **2310** is visible "beneath" deep tag thumbnail **2335**. When there are plural deep tags associated with a movie frame, then plural deep tag thumbnails appear in viewing area **2310** while the movie frame is displayed.

Deep tag send button **2340** is associated with deep tag imprint **2320**, and provides a quick way to send the deep tag to another party. For example, if the cursor clicks on deep tag send button **2340**, a small pop-up window opens and enables the user to specify the recipient's address.

A streamlined way for creating and sending a deep tag is also provided, sometimes referred to as a "one-click deep tag".

Assume that movie **20**J is being viewed in screen display **2300** on PC **140** by a user. Movie **20**J is typically provided from movie storage **20** (FIG. **1**), but can alternatively be provided from movie storage **90** (FIG. **1** or **36**). When the user clicks on fast deep tag button **741**, a deep tag is automatically created and pop-up window **2350**, shown in FIG. **42**, appears so that the user can specify where, if anywhere, the deep tag should be sent.

Generally, the owner of the website from which movie **20**J is provided specifies how a fast deep tag is created, selecting from one or more of the following:

- User preferences—follow the preference of a registered (formal) viewer for how the fast deep tag button operates, and if the viewer is not a registered viewer, then use one of the following techniques as a default;
- Simple deep tag—a specified amount of the movie is captured before or after button **741** is clicked, with the amount being determined by the owner of the website, the user, or the owner of the movie;
- Duration deep tag—the portion of the movie that plays while button **741** is being clicked on is captured; thus, beginning to click the fast deep tag button serves as a first indication and ending clicking of the fast deep tag button serves as a second indication;
- Bracket deep tag—after button **741** is clicked, a first amount of the movie preceding the click and a second amount of the movie subsequent to the click are captured, with the first and second amounts being determined by the owner of the website, the user, or the owner of the movie;
- Frame deep tag—after button **741** is clicked, a single frame is captured, such as the frame being displayed when the button is clicked, or the frame indicated by positioner **730**;
- Tail deep tag—after button **741** is clicked, a deep tag is created encompassing the portion of the movie from the click until the end of the movie;
- Two click deep tag—the first click of button **741** indicates the start of a new deep tag, the movie continues to play in screen **2300**, and the second click of button **741** indicates the end of the deep tag.

FIG. **42** is a diagram of pop-up window **2350** for creating a deep tag. Window **2350** appears after a fast deep tag has been created, as described above. If the user does not wish to send the just-created deep tag to anyone, the user clicks on the cancel button. Otherwise, the user provides data and clicks on the send button. The provided data includes the sender's address, the recipient's address, the desired access permission, and whether instant deep tag sending is enabled.

Access permission refers to whether and how the recipient can alter the deep tag. At one level, no alterations are permitted. At the standard level, the recipient can add comments but cannot otherwise alter the deep tag. At another level, the recipient can create their own version of the deep tag, indicating more or less of the original movie and possibly indicating another movie, and inheriting the text associated with the first deep tag.

Instant deep tag sending is discussed below with regard to FIG. **43**. If this is not enabled, the deep tag can be sent only as a hyperlink in an email message.

In one embodiment of movie system **10**, a deep tag creator is either an anonymous user, a casual user or a formal user. Movie system **10** can consider deep tags created by some or all of anonymous, casual and formal users when determining the popularity or other statistic of a movie.

An anonymous user is not known to movie system **10**. Deep tags created by an anonymous user are generally not stored for subsequent retrieval by the anonymous user, that is, they exist only while the anonymous user is interacting with the movie associated with the deep tag. Deep tags created by anonymous users have analytic value to movie system **10**. An anonymous user can comment on and rate only their own deep tags. Movie system **10** tracks deep tags from anonymous users via a suitable temporary mechanism, such as a cookie.

A casual user is a user for which movie system **10** knows only his or her address, such as email address or instant message ID or telephone number. Typically, an anonymous user converts to a casual user by entering an address in the sender portion of pop-up window **2350**. A casual user can comment on and rate only their own deep tags. Deep tags created by a casual user can be retrieved by the casual user, generally because a so-called cookie is stored on the casual user's access device, or because the casual user provides their address to movie system **10**.

A formal user is a user that has registered with movie system **10** via a sign-up process involving creating a profile with a registered ID and demographic information relating to the user, and perhaps validating other of their information such as that their email address is actually controlled by them. Deep tags created by a formal user are stored in known content owner deep tag database **32** or unknown content owner deep tag database **34**. A formal user can comment on and rate movies and deep tags created by other formal users, can upload and deep tag movies, can make deep tags and movies public, and can search and browse their deep tags and public deep tags created by other formal users. A formal user can be a content owner. Movie system **10** may periodically invite casual users to convert to formal users. The demographic information associated with formal users makes their activities more valuable to movie system **10** than the activities of casual or anonymous users. In various embodiments of movie system **10**, the capabilities and privileges of a formal user may differ.

FIG. **43** is a diagram of a recipient's screen showing reception of an instant deep tag, that is, an icon that appears

on a display and which can be clicked on to generate a pop-up window to play the movie segment indicated by the deep tag. The instant deep tag typically has the address of the sender, and sometimes includes descriptive text, if any, provided by the sender either when causing the deep tag to be instantly sent, or associated with the deep tag. A sample format for a pop-up player is shown in FIG. **28**. In some embodiments, the pop-up player has the format shown in FIG. **36**. At the conclusion of play, the pop-up player may automatically display the home page of the website that provides the movie associated with the deep tag. Typically, before the instant deep tag icon appears on the recipient's display, the recipient is asked whether he or she wishes to accept the deep tag. The recipient may specify in his or her profile that instant deep tags are permitted from certain senders, i.e., a whitelist, and may specify that instant deep tags are prohibited from certain senders, i.e., a blacklist; these specifications operate to automatically accept or refuse an instant deep tag, avoiding the acceptance question.

FIG. **44** is a flowchart showing details of creating and modifying deep tags.

Let it be assumed that movie system **10** has received a request to create a deep tag, such as when a user clicks on deep tag button **740** or fast deep tag button **741**.

At step **2400**, movie system **10** determines whether the content owner of the movie is known, such as by checking known content owner movie-id-print database **31** or by recognizing that the movie is stored in movie storage **20**. If the content owner is known, then at step **2405**, movie system **10** follows the content owner's rules for deep tag creation relative to the movie. For example, the content owner may permit deep tags only to be made from a specified version of the movie, not from other copies thereof. As another example, the content owner may require that at the conclusion of play of a deep tagged segment, the player loads a particular webpage. As a further example, the content owner may require that the deep tag include one or more advertisements included in the content. As a yet further example, the content owner may require a share of revenue realized from viewing of the content or any deep tagged portion of the content. Other rules are contemplated such as controlling the ways in which deep tags can be combined, where some deep tags might only be allowed for combining with deep tags from the same content owner. At step **2410**, the deep tag is added to known content owner deep tag database **32**, and deep tag creation processing is complete.

However, if the content owner is unknown, then at step **2415**, movie system **10** notifies the would-be creator that the content owner is unknown and so movie system **10** will be collecting data on who views the to-be-created deep tag, and when, and will be notifying recipients of the deep tag that if they click it, data about them will be collected. The notification is provided by a pop-up window, playing an audio file, or other suitable means. In some embodiments, the would-be creator notifies movie system **10** of who the likely content owner is, such as by selecting from a menu of registered content owners and/or by providing contact information and/or a name of the content owner; this serves as a request for permission to use the content, which is generally forwarded by movie system **10** to the likely content owner. At step **2420**, it is determined whether the would-be creator consents to the data collection. If not, processing is complete. If consent is provided, then at step **2425**, movie system **10** creates the deep tag and adds it to unknown content owner deep tag database **34**. Then, at step **2430**, movie system **10** checks whether the movie has a movie-id-print in unknown content owner movie-id-print database **33**. If so, this means that registered content owners have already been notified, and so processing is complete. If not, at step **2433**, movie system **10** places the movie-id-print to unknown content owner database **33**, and at step **2435**, movie system **10** sends an alert to all registered content owners, or to a subset of all registered content owners, and to the owner of the site where the deep tagged movie resides, if the site owner is known. The subset may be determined by the text associated with the movie, by the similarity of the movie to movies with known content owners, or by another suitable method.

Registered content owner **141** is a party who has previously registered with movie system **10** to receive alerts when a movie with an unknown content owner is deep tagged. At step **2480**, registered content owner **141** receives an alert from movie system **10**. At step **2485**, owner **141** determines whether they own the content, and if so, establishes ownership by a suitable procedure. In some cases, content ownership is established in response to other than alerts from movie system **10**; that is, a content owner may otherwise become aware that its content is being used through movie system **10**. At step **2490**, owner **141** specifies rules for deep tagging the movie, and sends the rules to movie system **10**.

At step **2450**, movie system **10** receives the newly created content owner's rules for deep tagging. If not already done during step **2485**, movie system **10** transfers the movie-id-print from database **33** to database **31**. At step **2460**, movie system **10** ensures that deep tags associated with the movie comply with the rules, and if they do not, either (a) the deep tags are suitably adjusted, or (b) the deep tag is rendered inactive, and the deep tag creator is invited to adjust the deep tag to make it active again. At step **2465**, the deep tags associated with the movie are moved from database **34** to database **32**. At step **2470**, movie system **10** notifies the deep tag creator and all parties who have viewed the deep tag that the content owner is known, and any unauthorized copies should be destroyed or brought into compliance with the content owner's rules.

Dynamically updated viewer displays will now be discussed. First, dynamically updated deep tags will be discussed. Then, dynamically updated movie selections will be discussed.

Dynamically updated deep tags are relevant when a viewer is watching a movie in a manner in which the viewer can see the deep tags associated with the movie, such as:

- by viewing a thumbnail associated with the deep tag, shown for example as deep tag thumbnail **738**A in FIG. **35**;
- by viewing a popularity graph of the deep tags for a movie, shown for example as a color graph in graph area **1394** in FIG. **35**, or density function **960** in FIG. **16** (that would be displayed in graph area **1394**), or cloud graph **980** in FIG. **16** (that would be displayed in graph area **1394**);
- by viewing a composited deep tag thumbnail, shown for example as deep tag thumbnail **2335** in FIG. **41**; or
- by using a cursor positioning device such as a mouse to view information associated with deep tags indicated on a texture strip, such as deep tag imprint **2320** in FIG. **41**.

Movie system **10** receives, in real time, information about how a viewer is interacting with a movie, such as clicking the play button, the pause button and so on. Accordingly, movie system **10** knows all current viewers of a movie.

When one viewer of a movie acts on a deep tag, such as creating, editing or deleting the deep tag, then the deep tag

displays, if any, for all other viewers of the movie are updated to reflect the deep tag act. This is dynamically updated deep tag display.

It will be recalled that if the viewer is an anonymous user, the deep tags created by that viewer persist only for the duration of the viewer's session. Specifically, when movie system **10** determines that the anonymous user is no longer watching the movie, movie system **10** dynamically updates the displays of all other viewers of the movie to delete any deep tags created by the anonymous user.

In some embodiments, formal users and/or the owner of the movie and/or the owner of the website that provides the movie can control whether dynamically updated deep tag displays are supported. Specifically, some formal users may prefer to turn off this feature.

Dynamically updated movie selections enable movie system **10** to operate in a sort of narrowcast format. Different versions of dynamically updated movie selections are discussed. It will be appreciated that other versions of dynamically updated movie selections can be configured.

A first version of dynamically updated movie selections enables a formal user of movie system **10** to specify characteristics of movies that should be presented to the user, and then the user can just view in a passive mode, without selecting movies. Example characteristics are:

- the most popular movies that I haven't seen yet, in all of movie system **10**
- the most popular movies that I haven't seen in the last week, in all of movie system **10**
- the most popular movies that I haven't seen yet, among female viewers age 20-25 in New York and London
- the most popular movies that I haven't seen yet with the keyword "Paris"

In a variation of this version of dynamically updated movie selections, instead of the whole movie being displayed, only its deep tags with certain characteristics are displayed, such as its three most popular deep tags, deep tags created by users with certain demographic characteristics, or deep tags created by specifically named users.

A viewing trail is a particular sequence of movie viewing for a particular user. The viewing trail includes not only which movies were viewed, but also the actions taken for the movie, such as play, pause, fast forward, rewind and so on.

In another version of dynamically updated movie selections, formal users can designate their viewing trails as public or private. Movie system **10** assumes a default of "private" for viewing trails. A formal user can specify the level of public access to their viewing trails, e.g., open to all, open to anyone who pays, open to designated users (whitelist), open to all except designated users (blacklist), open to users with certain demographic characteristics, open to all except users with certain demographic characteristics, and so on.

If a formal user has public viewing trails, then another formal user can instruct movie system **10** to show the other formal user the movies that were viewed by the first formal user, such as in the first formal user's most recent movie viewing, on a specific day or meeting other characteristics. This is useful when the first formal user is a celebrity, or carefully selects their viewing trails. It will be appreciated that a public viewing trail is a simple version of a mash-up movie. However, the creator of the mash-up usually recognizes revenue from ads inserted into the mash-up. The creator of a viewing trail can recognize revenue from something akin to a subscription model. In most cases, creation of a viewing trail is easier to accomplish than creation of a mash-up movie. In a variation, the first formal user can create a viewing trail, and then email it to friends.

In a variation of this version of dynamically updated movie selections, instead of the whole movie being displayed, only its deep tags created by the first formal user are displayed.

Although an illustrative embodiment of the present invention, and various modifications thereof, have been described in detail herein with reference to the accompanying drawings, it is to be understood that the invention is not limited to this precise embodiment and the described modifications, and that various changes and further modifications may be effected therein by one skilled in the art without departing from the scope or spirit of the invention as defined in the appended claims.

What is claimed is:

1. A method for movie segment bookmarking and sharing, the method comprising:

providing, by a movie system operating on a server computer to a user device through a user interface, a texture strip comprising frame representations of a video and a marker overlaying the texture strip for marking a segment of the video;

receiving, by the movie system based on the marker overlaying the texture strip, information about the segment of the video, the information indicating a sequential group of frames in the segment of the video;

generating, by the movie system based on the information about the segment of the video, a movie segment bookmark that tags the segment of the video, wherein the movie segment bookmark includes a start time and an end time for the segment of the video;

storing, by the movie system, the movie segment bookmark at a segment address for accessing the segment of the video, the segment address containing at least one of a first identifier identifying the movie segment bookmark, a second identifier identifying the video, the start time, or the end time for the segment of the video; and

sending, by the movie system, the movie segment bookmark over a network to a viewer device, wherein activating the movie segment bookmark on the viewer device causes the viewer device to play the segment of the video.

2. The method according to claim **1**, wherein the movie segment bookmark further includes at least one of: a movie filename, a user filename, a user identifier, a date of creation, a date of most recent modification of the movie segment bookmark, a deep tag filename, a start frame, an end frame, a duration of the segment, a short text description of the segment, or a name of a video owner who owns the video.

3. The method according to claim **1**, further comprising:

receiving, through a sharing button on the user interface, sharing permission to view the segment of the video; and

providing the sharing permission to the viewer device.

4. The method according to claim **1**, further comprising:

receiving an identification of a viewer permitted to access the segment of the video; and

sending an email to the viewer identifying the segment address for accessing the segment of the video.

5. The method according to claim **1**, further comprising:

receiving indications of a plurality of segments of the video through previously defined movie segment bookmarks for the plurality of segments of the video;

receiving an identification of a viewer or a group of viewers permitted to access which of the plurality of segments of the video; and

providing the previously defined movie segment bookmarks for the plurality of segments of the video to the viewer or the group of viewers.

6. The method according to claim **5**, wherein the group of viewers includes an outside user, the method further comprising:

sending an email to the outside user identifying a segment address for accessing one of the plurality of segments of the video that the outside user is permitted to access.

7. The method according to claim **1**, further comprising:

receiving an instruction from the user device to share the video; and

listing the video in a directory accessible to users of the movie system.

8. A movie system for movie segment bookmarking and sharing, the movie system comprising:

a processor;

a non-transitory computer-readable medium; and

instructions stored on the non-transitory computer-readable medium and translatable by the processor for:

providing, to a user device through a user interface, a texture strip comprising frame representations of a video and a marker overlaying the texture strip for marking a segment of the video;

receiving, based on the marker overlaying the texture strip, information about the segment of the video, the information indicating a sequential group of frames in the segment of the video;

generating, based on the information about the segment of the video, a movie segment bookmark that tags the segment of the video, wherein the movie segment bookmark includes a start time and an end time for the segment of the video;

storing the movie segment bookmark at a segment address for accessing the segment of the video, the segment address containing at least one of a first identifier identifying the movie segment bookmark, a second identifier identifying the video, the start time, or the end time for the segment of the video; and

sending the movie segment bookmark over a network to a viewer device, wherein activating the movie segment bookmark on the viewer device causes the viewer device to play the segment of the video.

9. The movie system of claim **8**, wherein the movie segment bookmark further includes at least one of: a movie filename, a user filename, a user identifier, a date of creation, a date of most recent modification of the movie segment bookmark, a deep tag filename, a start frame, an end frame, a duration of the segment, a short text description of the segment, or a name of a video owner who owns the video.

10. The movie system of claim **8**, wherein the instructions are further translatable by the processor for:

receiving, through a sharing button on the user interface, sharing permission to view the segment of the video; and

providing the sharing permission to the viewer device.

11. The movie system of claim **8**, wherein the instructions are further translatable by the processor for:

receiving an identification of a viewer permitted to access the segment of the video; and

sending an email to the viewer identifying the segment address for accessing the segment of the video.

12. The movie system of claim **8**, wherein the instructions are further translatable by the processor for:

receiving indications of a plurality of segments of the video through previously defined movie segment bookmarks for the plurality of segments of the video;

receiving an identification of a viewer or a group of viewers permitted to access which of the plurality of segments of the video; and

providing the previously defined movie segment bookmarks for the plurality of segments of the video to the viewer or the group of viewers.

13. The movie system of claim **12**, wherein the group of viewers includes an outside user and wherein the instructions are further translatable by the processor for:

sending an email to the outside user identifying a segment address for accessing one of the plurality of segments of the video that the outside user is permitted to access.

14. The movie system of claim **8**, wherein the instructions are further translatable by the processor for:

receiving an instruction from the user device to share the video; and

listing the video in a directory accessible to users of the movie system.

15. A computer program product for movie segment bookmarking and sharing, the computer program product comprising a non-transitory computer-readable medium storing instructions translatable by a processor of a movie system for:

providing, to a user device through a user interface, a texture strip comprising frame representations of a video and a marker overlaying the texture strip for marking a segment of the video;

receiving, based on the marker overlaying the texture strip, information about the segment of the video, the information indicating a sequential group of frames in the segment of the video;

generating, based on the information about the segment of the video, a movie segment bookmark that tags the segment of the video, wherein the movie segment bookmark includes a start time and an end time for the segment of the video;

storing the movie segment bookmark at a segment address for accessing the segment of the video, the segment address containing at least one of a first identifier identifying the movie segment bookmark, a second identifier identifying the video, the start time, or the end time for the segment of the video; and

sending the movie segment bookmark over a network to a viewer device, wherein activating the movie segment bookmark on the viewer device causes the viewer device to play the segment of the video.

16. The computer program product of claim **15**, wherein the movie segment bookmark further includes at least one of: a movie filename, a user filename, a user identifier, a date of creation, a date of most recent modification of the movie segment bookmark, a deep tag filename, a start frame, an end frame, a duration of the segment, a short text description of the segment, or a name of a video owner who owns the video.

17. The computer program product of claim **15**, wherein the instructions are further translatable by the processor for:

receiving, through a sharing button on the user interface, sharing permission to view the segment of the video; and

providing the sharing permission to the viewer device.

18. The computer program product of claim **15**, wherein the instructions are further translatable by the processor for:

receiving an identification of a viewer permitted to access the segment of the video; and

sending an email to the viewer identifying the segment address for accessing the segment of the video.

19. The computer program product of claim **15**, wherein the instructions are further translatable by the processor for:

receiving indications of a plurality of segments of the video through previously defined movie segment bookmarks for the plurality of segments of the video;

receiving an identification of a viewer or a group of viewers permitted to access which of the plurality of segments of the video; and

providing the previously defined movie segment bookmarks for the plurality of segments of the video to the viewer or the group of viewers.

20. The computer program product of claim **19**, wherein the group of viewers includes an outside user and wherein the instructions are further translatable by the processor for:

sending an email to the outside user identifying a segment address for accessing one of the plurality of segments of the video that the outside user is permitted to access.

* * * * *